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OIL WELL SUPPLY CO.

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SECTION A No. 21

OIL WELL SUPPLIES

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Nevada Petroleum Co.

— 1909 —

1

1859 "THE OLD" AND "THE NEW" 1907

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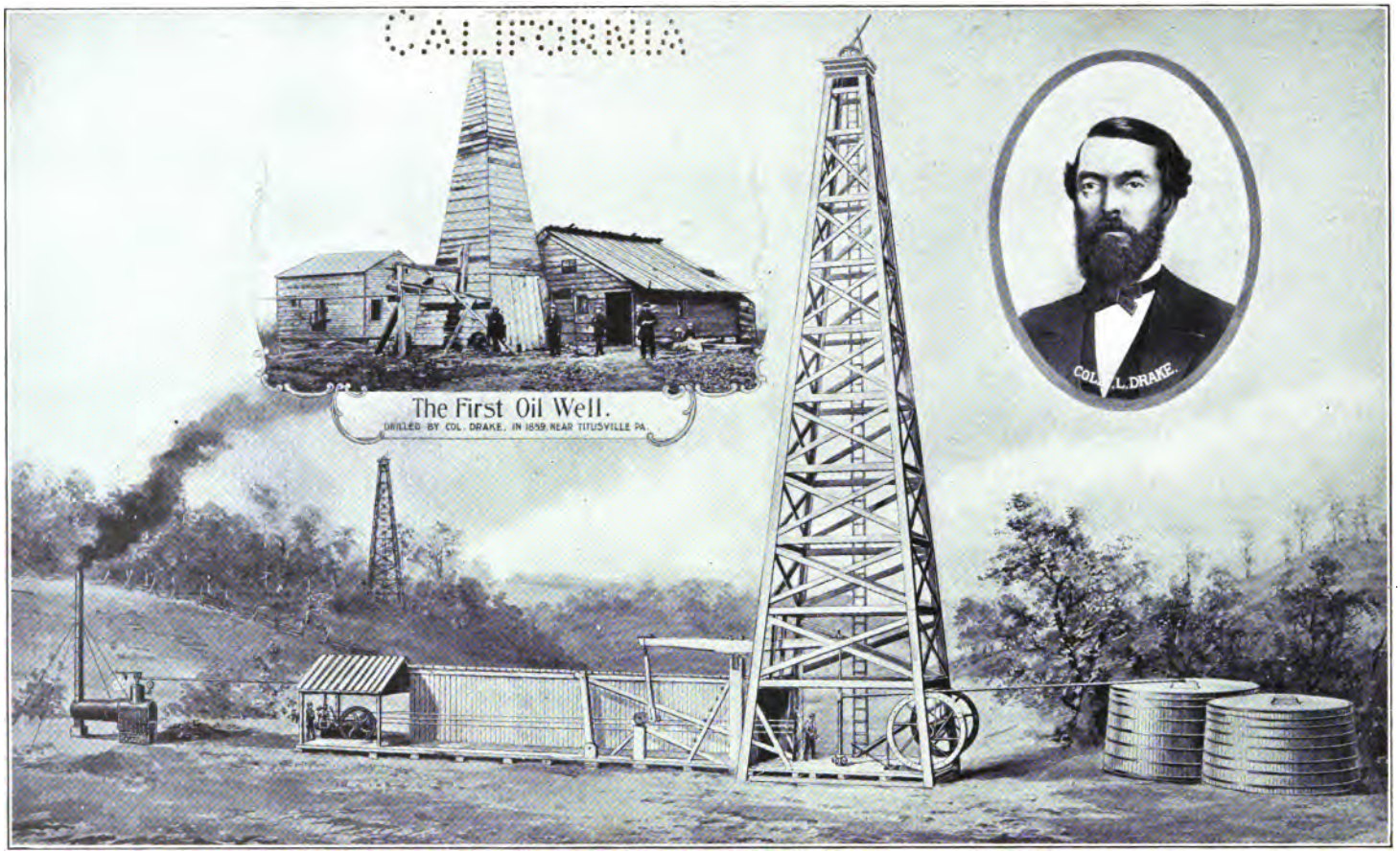

THE FIRST OIL WELL
Height of Derrick - - - - - 34 feet

MODERN OIL WELL
Height of Derrick - - - - 82 feet

WELL-DRILLING MACHINERY AND TOOLS

No. 21

Univ. of California

SECTION

A

OF PRICE LIST

OIL WELL SUPPLY CO.

MAIN OFFICES

PITTSBURGH, PA., U. S. A.

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CHICAGO

FACTORIES

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Oil City, Pa. Parkersburg, West Va.

Bradford, Pa. Poplar Bluff, Mo.

Memphis, Tenn.

BRANCH STORES

In all Petroleum Districts

Illustrated price lists issued by the Company

SECTION A.—Well-Drilling Machinery and Tools

SECTION B.—Gas Well and Pipe Line Equipment.

SECTION C.—Steam and Water Fittings

SECTION D.—Hydraulic Rotary Drilling Outfit.

SECTION E.—Pumping-Well Supplies.

Telegraph Address: Eaton, Pittsburgh

CODES

A. B. C. 4th and 5th Editions **Lieber's Standard**

A. 1. **Western Union** **O. W. S. Co.'s Private Code**

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WORLD'S COLUMBIAN EXPOSITION
IN COMMEMORATION OF THE
FOUR HUNDREDTH ANNIVERSARY
OF THE LANDING OF COLUMBUS
MDCCCXCII - MDCCCXCIII
OIL WELL SUPPLY CO.

THE UNITED STATES OF AMERICA
THE WORLD'S COLUMBIAN COMMISSION
OIL WELL SUPPLY COMPANY
PITTSBURG, PENNSYLVANIA.
EXHIBIT
OIL AND NATURAL GAS WELL TOOLS AND APPLIANCES

EXPOSITION UNIVERSELLE INTERNATIONALE
1900
OIL WELL SUPPLY COMPANY

RÉPUBLIQUE FRANÇAISE

ARTS
RÉPVBLIQVE FRANÇAISE
EXPOSITION UNIVERSELLE DE 1900
LE JURY INTERNATIONAL DES RÉCOMPENSES
GRAND PRIX
à OIL WELL SUPPLY COMPANY, à PITTSBOURG
ÉTATS-UNIS

IMPERIAL WORKS, OIL CITY, PA.
Steam Engines, Gas Engines, Cast and Malleable Iron Goods and Drop Forge Work.

Description of the New Manufacturing Plant of the Oil Well Supply Company, Known as the "Imperial Works," Located at Oil City, Pa., About One Mile From the Center of the City, on Line of Electric Railway.

The plot of ground comprises nearly forty-five acres, of which about twenty-five acres are devoted to manufacturing purposes, the balance for dwelling house sites.

The works are located on the Allegheny River, on the lines of the Pennsylvania, Lake Shore and Michigan Southern, and Erie railroad systems.

The ground devoted to manufacturing purposes covers a distance of about twenty-seven hundred feet in length, along the railroad and river, and several hundred feet in width.

There are nearly forty buildings devoted to manufacturing purposes, mostly one story in height, constructed of steel and brick with slate roofs, all well lighted and ventilated.

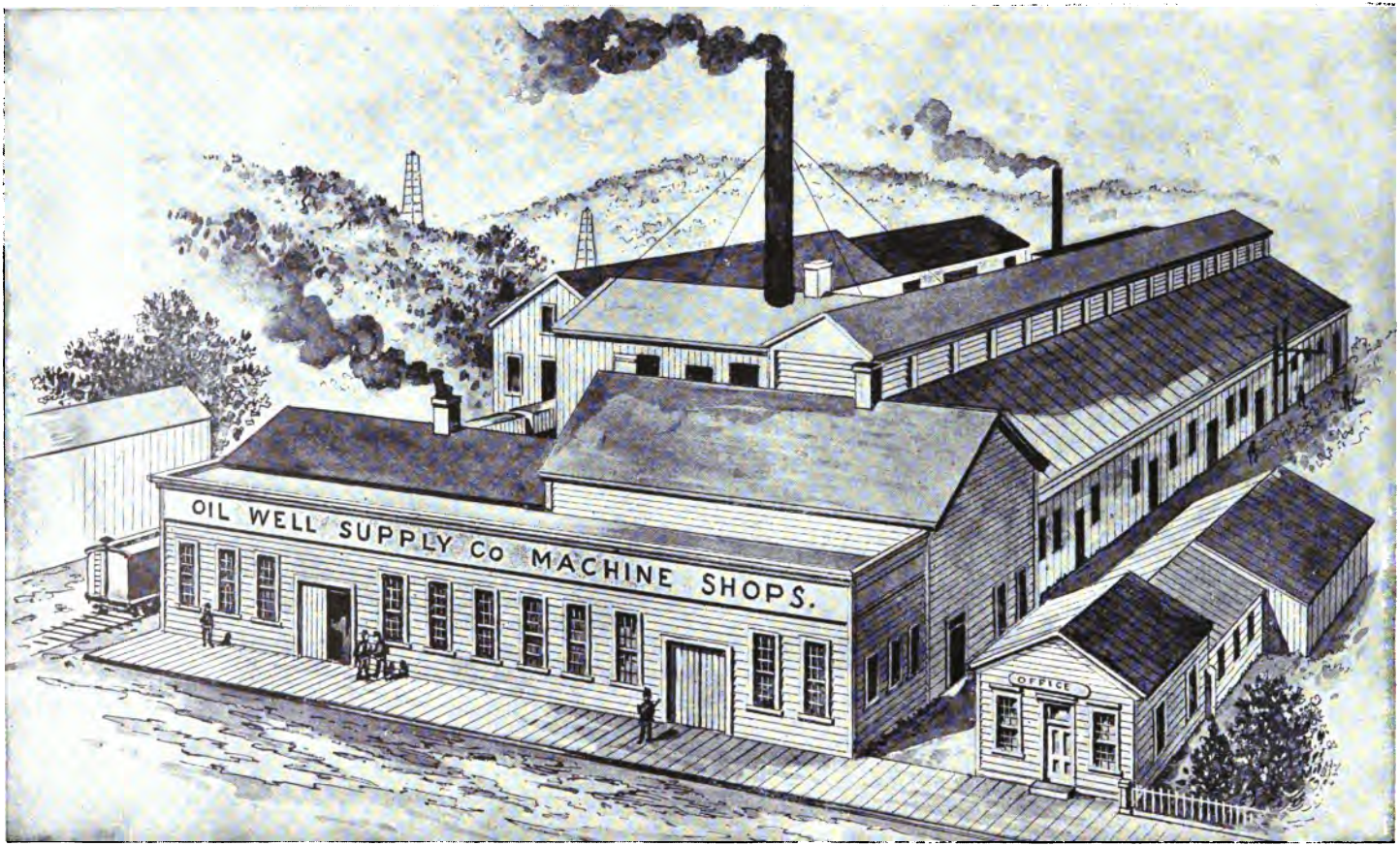
The size of each building, and the purpose for which it is designed, are as follows: (See illustration.)

		FEET	
No. 1.	Office Building	50 x 75	Three Stories
" 2.	Engine Works and Machine Shop	150 x 200	
" 2 Annex.	Engine Works Storage	22 x 150	
" 3.	General Manufacturing Department	150 x 200	
" 3 Annex.	Storage	22 x 134	
" 4.	Pattern Shop	50 x 130	
" 5.	Blacksmith Shop	75 x 150	
" 5 Annex.	Storage	22 x 134	
" 6.	Pattern Storage	75 x 150	
" 6 Annex.	Storage	27 x 134	
" 7.	Drop Forge Department	75 x 150	
" 7 Annex.	Storage	22 x 134	
" 8.	Fittings Tapping Department	50 x 150	
" 9.	Iron Rod Department	75 x 150	
" 9 Annex.	Storage	22 x 134	
" 10.	Annealing	50 x 150	
" 10 Annex.	Storage	22 x 150	
" 10 Annex.	Sorting and Grinding	14 x 111	
" 11.	Sucker Rod Department	75 x 150	
" 12.	Malleable Iron Foundry	75 x 190	
" 14.	Malleable Iron Foundry Joined	120 x 50	
" 14 Annex.	" " " Joined	100 x 40	
" 15.	Portable Drilling Rigs	75 x 150	
" 16.	Malleable Iron Department Office	16 x 24	
" 17.	Locomotive House	18 x 70	
" 18.	Gray Iron Foundry	75 x 300	and 50 x 150
" 19.	Raw Stock Storage	40 x 280	
" 20.	Foundry Storehouse	50 x 150	
" 22.	Power House	75 x 100	
" 23.	Lumber Storage	22 x 32	
" 26.	Galv. Department and Cooper Shop	30 x 80	and 40 x 52
" 29.	General Storage and Shipping Dept.	76 x 234	
" 29 Annex.	" " " " "	77 x 126	
" 30.	Sand Shed	29 x 80	
" 31.	Rattling Room for Gray Iron Dept.	35 x 70	
" 32.	Malleable Iron Pattern Storage	32 x 70	Two Stories
" 33.	Drilling Machine Department	60 x 100	
" 34.	Malleable Iron Department, Core Room	40 x 132	Two Stories
" 38.	Paint Storage	37 x 50	

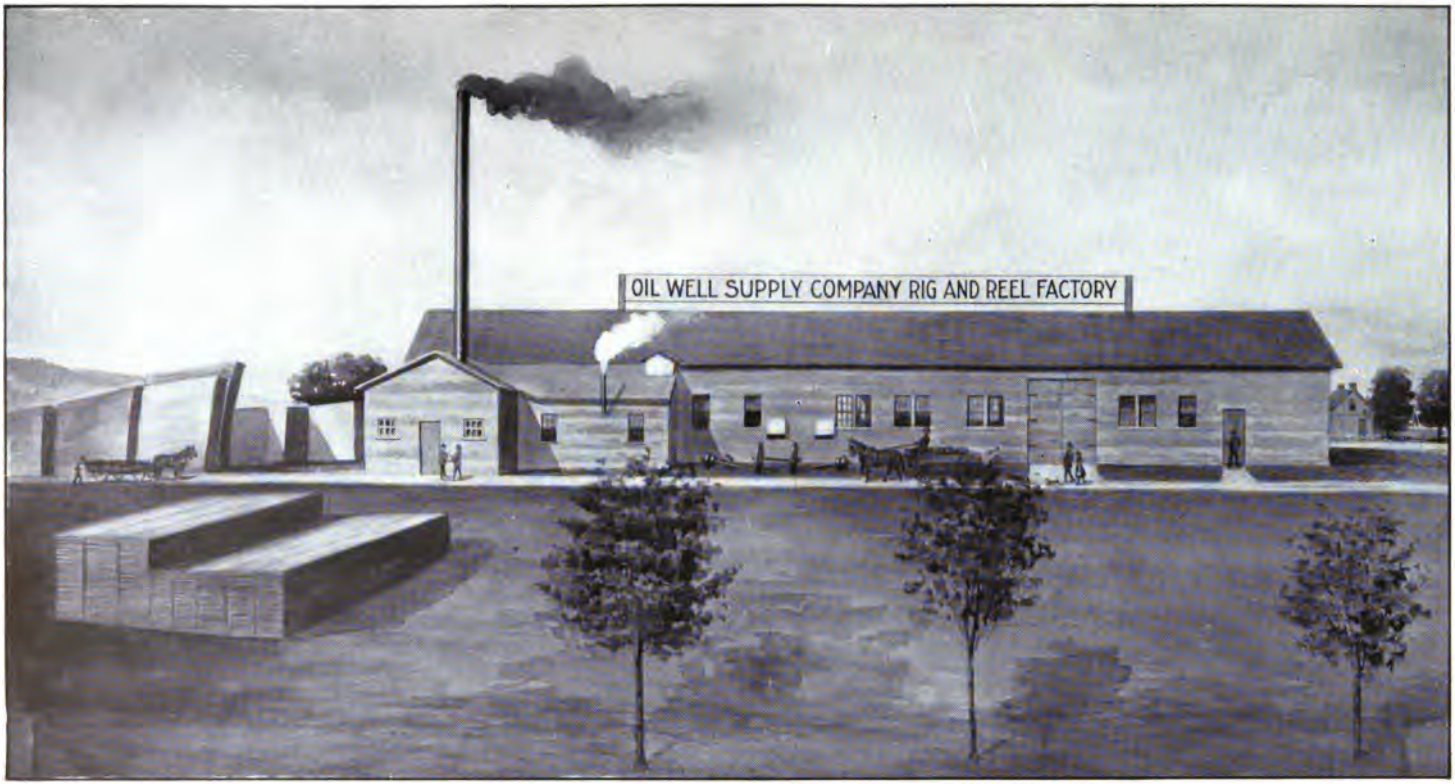
Total Floor Area, 360,000 square feet.

TWENTY-FIRST STREET WORKS, PITTSBURGH
Drilling Tools

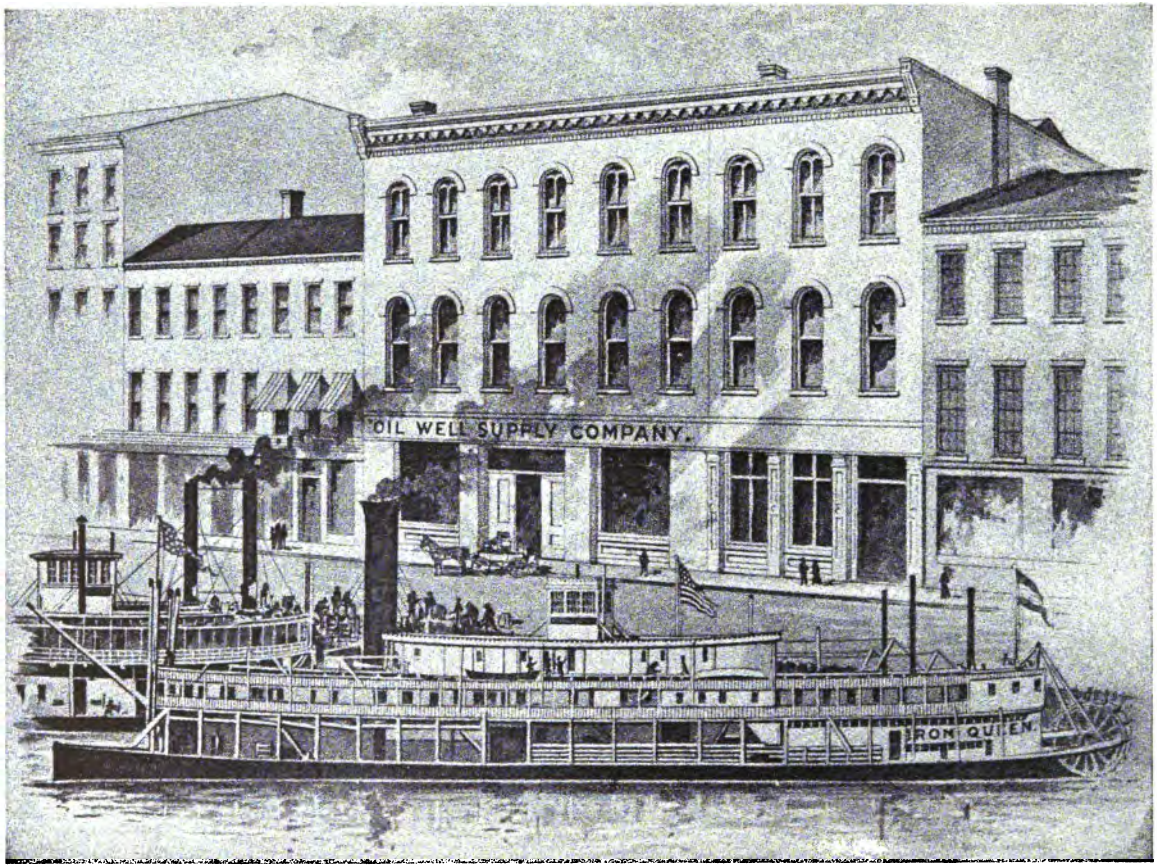
BOILER WORKS, OSWEGO, N. Y.
Oil Country Boilers—Water Tube Boilers



MACHINE AND BLACKSMITH SHOPS, BRADFORD, PA.



RIG DEPARTMENT, PARKERSBURG, W. VA.
Wood Work for Derricks, etc.



STORE AND MAIN OFFICES, 213–217 WATER STREET, PITTSBURGH, PA.

NEW YORK OFFICE

Havemeyer Building, Cor. Church and Cortlandt Sts.

EXECUTIVE OFFICES OF THE COMPANY

213-215-217 Water Street

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Louis Brown - -	Treasurer
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CALIFORNIA

OFFICE OF THE

OIL WELL SUPPLY CO.,

213, 215 and 217 Water Street,

PITTSBURGH, PENNSYLVANIA,

United States of America.

THE process of obtaining water and of testing for minerals by sinking wells of small diameter has been practiced for many hundred years. In Europe it was first employed in the province of Artois, in the north of France, whence the name "Artesian" is derived.

Within the gardens of a former Dominican convent at Lillers, in Artois, there is a deep well which has flowed continuously since the year 1126, and unmistakable traces of much more ancient ones are found in various countries. Formerly it was a very difficult, tedious and expensive operation to drill a deep well, but now one can be sunk 2,000 feet at a moderate cost, and in a comparatively short time.

The modern method is an adaptation of steam power to the method practiced for ages in China. Free falling tools, suspended by a cable and worked by steam power, are used, the weight of the tools being so great as to give blows of sufficient force to pierce the hardest rock. In the Oil Regions of the United States there have been sunk many more Artesian wells than in all other parts of the world together, and great industries have been created for manufacturing the apparatus and tools to sink wells to great depths. The first well drilled for the express purpose of obtaining Oil was sunk near Titusville, in the State of Pennsylvania, by Col. E. L. Drake in 1859, since which time more than 150,000 wells have been drilled in Pennsylvania and adjoining States. There is no publication dealing with the subject or science of drilling deep wells. It is impracticable to place such work in the hands of other than experienced men. The so-called "oil country outfit" is a variable term. It is a safe assertion that two could not be found alike in all details. While the general characteristics vary but little, it is the detail which must be considered by the manufacturer, and which involves great change in selection and variation in price. It must be borne in mind that very little of this is due to fancy or other cause than that of necessity. Each outfit must be made up of parts all of which harmonize and work well together and are adapted to the particular conditions under which the outfit is to be used. From this may easily be conceived the inability of naming prices on an "ordinary outfit."

They are all ordinary to the manufacturer, but one perfectly adapted to one section of country might be almost useless in another. In attempting to assume that any particular combination might meet the requirements of a prospective customer we would depart from the proper province of the manufacturer, except in

such cases as will be referred to later on. A few general rules and observations may be given which will be of interest and value. For this purpose we will divide the material composing an outfit in the following manner:

RIG

This refers only to the structure, with its foundations of heavy timbers, and the wheels and reels on which are carried the lines or cables to which are attached the drilling tools proper. We furnish all the irons, nails, bolts, and special parts for building the wheels and reels, and can, if desired, give specifications for cutting the timber and lumber, which may be obtained from local sources. The portion which we furnish will cost from $60.00 to $325.00, according to size and design. The weight varies from 15 cwt. to 80 cwt. In cases where timber and lumber cannot be obtained we supply the entire Rig, carefully framed, and ready to erect. Prices vary from $600.00 to $900.00, and average weight equivalent to two ordinary car lots, or 60,000 lbs. Shallow wells not exceeding 600 to 800 feet in depth may be drilled through ordinary formations by the use of the Corbett Mast Rig, illustrated by Fig. 1295, page 36. This Rig, while not as strong or admitting of such rapid work as the standard Rig, is particularly useful for prospecting or for conducting work where transportation facilities are limited and economy more desirable than speed.

MACHINERY

By this we refer to the Boiler and Engine. The former ranges from 15 to 40 H. P., the latter from 12 to 30 H. P. Both are specially adapted to the work, and the Engine in particular is an essential. In fact, it is not practicable to use an ordinary engine for this purpose. Price, Boiler and Engine, from $580.00 to $900.00. Weights, 8,000 to 16,000 lbs.

DRILLING TOOLS

We include under this head all essentials for making the bore and cleaning out the detritus, also all special appliances for removing tools which may be broken or otherwise fastened in the bore; also Cable and Sand Line, and tools for handling casing and pipe used in the construction of the well. This is the portion of the outfit which must be selected with the greatest care, and with an eye to its efficiency in meeting the peculiar conditions for which it is intended. It is quite impossible to give other than the widest range, and while some of the simplest and lightest outfits might be used to advantage at a cost of $500.00, other conditions might require the expenditure of $4,000.00 to $5,000.00.

TUBULAR GOODS

Every well requires some casing or piping in its construction. In some wells a single column of casing to shut off the water is sufficient, in others several such are needed, each column being of a size to pass through the preceding column with the

least possible lost space between the two. Frequently it is necessary to drive the columns of pipe instead of inserting them after the bore is prepared to receive them. In that case heavy pipe called drive pipe must be used. In drilling a well in a district where the geological formation is not well known it is much safer to use drive pipe. The ordinary sizes are 10, 8, 6 and 4½ inches inside diameter. No one can tell how much of each size might be required until the initial well is completed.

In the different districts of the Oil Regions the correct amounts can be quite accurately determined, as well as the sizes and kinds which can be most economically used. The foregoing observations apply to all operations conducted where the formations are composed largely of rock of varying degrees of hardness. The recent developments in Texas disclose a formation nearly devoid of rock, the formation from surface to oil-bearing stratum being a series of strata of clay and quicksand. To successfully cope with this unusual condition a quite different system is necessary, known as the

ROTARY HYDRAULIC OUTFIT

This includes Boiler and Engine for power, heavy Steam Pump for the hydraulic pressure, special Hoisting Gear, Rotary Table for turning and lowering the pipe, and special appliances for connecting and operating the outfit. Such an outfit, costs, to-day, about $3,000.00. The contractors having the most experience use **two** Boilers and **two** Pumps to provide against the danger of sticking the pipe by stopping for repairs. This would increase the cost about $650.00.

The Rig used is a simple derrick, which can be built by any ordinary carpenter. The same rules pertaining to the regular outfit for casing and pipe will apply in the use of the **Rotary Hydraulic.**

COMBINATION RIG AND OUTFIT

The Combination Rig, as its name implies, embodies the principles of both the Standard Cable Rig and the Hydraulic Rotary Rig. This involves a higher cost and greater weight. A complete outfit, not including the Tubular goods or the timber and lumber for Derrick, costs about $5,000.00, and will weigh approximately 470 cwt.

PORTABLE DRILLING MACHINES

It has been shown that great power and strength are required in performing the ordinary functions of a drilling Rig. This implies a corresponding weight, or the very antithesis of mobility.

The obvious advantages of a Rig which may be freely moved about are such that many attempts have been made to produce one of sufficient power to compete with the standard Rig. These efforts have usually resulted in disappointment. The exceptions are so rare that experienced drillers are justified in questioning any broad claims, but in presenting the "Columbia" Steel Machine every statement is based on fact and experience. As manufacturers of Machinery and Supplies for all

branches of the business we aim to produce the best in each department. The following pages give our correspondents detailed prices of goods, thus enabling them to form close calculations on costs of equipment suited to individual requirements. As it is necessary for some one with experience to conduct the work, it would be more satisfactory to both seller and purchaser for such a one to make out a list of the tools and appliances needed. When such lists are furnished we are always ready to name net prices and time required for execution of order, or we will make estimates of a suitable plant when supplied with data and the necessary information as to requirements.

SKILLED WORKMEN

Require from $125.00 to $175.00 per month and traveling expenses both ways, their time to commence when leaving Pennsylvania and end on their return. There will be no charge for engaging such men for clients purchasing their goods from this company.

EXPORT

Drilling plants have been supplied to all habitable parts of the globe, and careful records have been kept of the geological formations and physical conditions. Such records and data are of inestimable value when used in connection with the specific information which ordinarily can be given by the intending operator.

DISCOUNTS

The lists given herein are in most instances subject to a discount, and discount sheets are issued at regular intervals, or as frequently as market conditions demand. Many goods, notably Tubular goods and Cordage, are subject to such frequent changes in value that prices can be given only on specification, and we cannot hold ourselves responsible for changes in price of any goods except on direct quotations, and when time limit has been specifically stated.

DELIVERY

All contracts are taken subject to strikes or other causes of delay beyond our control, and our responsibility ceases upon delivery to railroad or other common carrier. Insurance will be effected, whenever desired, at customer's cost.

CLASSIFICATION OF CONTENTS

	Pages
RIGS AND DERRICKS	6- 70
MACHINERY—BOILERS AND STEAM ENGINES	71-115
PIPE AND FITTINGS	118-130
CORDAGE—MANILA AND WIRE	131-133
DRILLING AND FISHING TOOLS	134-197
ELEVATORS—DRIVE TOOLS—CASING HEADS, ETC.	198-213
PUMPING OUTFITS	214-237
SURFACE EQUIPMENT	238-261
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PIPE CUTTING TOOLS	270-276
BLACKSMITH AND DERRICK TOOLS	277-282
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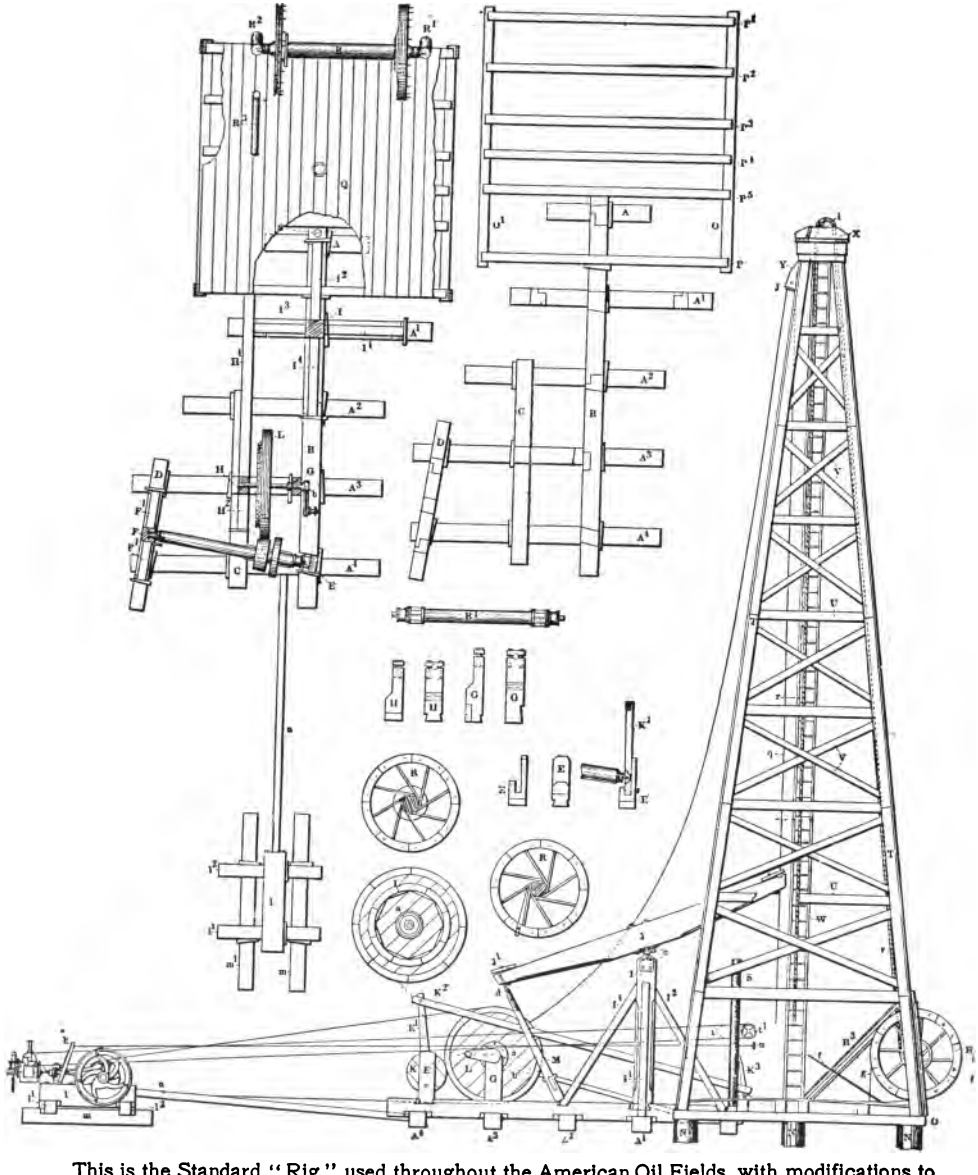
HARDWARE AND SUPPLIES	297-333
OIL BURNERS	334-336
STEAM PUMPS	337-348

The tabulated weights are approximated and are given for convenience in calculating transportation charges.

SIDE ELEVATION AND GROUND PLANS OF

STANDARD RIG—Fig. 1200



This is the Standard "Rig" used throughout the American Oil Fields, with modifications to suit varying conditions. We can furnish our customers with full set of blue prints, drawn to scale, so that the timbers and lumber may be prepared on the ground. In such cases we supply only the special irons and parts for building the Bull, Band, and Tug Wheels; or, we can suppiy the entire Rig, framed and ready for erection. For illustrations, prices, and weights, see following pages.

STANDARD RIG

TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG—DERRICK 72 FEET HIGH, BASE 20 FEET SQUARE

The sizes of timber and lumber may be exceeded, but not diminished. If necessity compels the use of smaller sizes, the deficiency in strength must be supplied by extra bracing.

The references are to Fig. 1200, page 6.

Pieces	Size, inches	Length, feet	Name	Illustration marks
1	14 x 14	8	Nose sill	A
4	14 x 14	16	Mud sills	A 1, 2, 3, 4
1	16 x 18	30	Main sill	B
1	16 x 18	16	Sub sill	C
1	12 x 12	12	Sand reel tail sill	D
6	16 x 18	4	Derrick foundation posts	N
2	10 x 10	21	Derrick sills	0, 01
2	14 x 14	14	Engine mud sills	m-m 1
2	12 x 12	7	Engine pony sills	1-1, 1-2
1	20 x 20	8	Engine block	1
1	6 x 6	32	Bumper, engine block to mud sill	n
6	8 x 10	20	Derrick floor sills	P, P 5
20	2 x 12	20	Derrick floor	Q
1	14 x 16	14	Samson post	I
2	6 x 8	14	Samson post braces	1 1, 1 4
1	6 x 8	16	Samson post brace	1 2
1	6 x 8	12	Samson post brace	1 3
*3	3 x 5	16	Keys	-----
*1	16 x 16	16	Front and rear jack posts, and knuckle post	G, H. E
*1	4 x 12	3	Jack post caps	-----
2	6 x 8	16	Jack post braces	-----
*1	12 x 12	5	Tail post	F
*2	12 x 12	11	Bull wheel posts	R 1, R 2
1	6 x 8	14	Bull wheel post brace	R 3
*1	6 x 8	8	Sand reel lever	K 1
*1	2 x 6	6	Sand reel handle	K 3
1	12 x 26	26	Walking beam	J
1	6 x 8	14	Headache post	S
*1	5 x 10	12	Pitman †	M
*1	4 x 12	12	Crown block	X
*1	2 x 12	10	Sand sheave pulley block	Y
*1	2 x 12	5	Adjuster board	J 1
14	2 x 10	16	Derrick legs	T
16	2 x 8	16	Derrick legs	T
2	2 x 8	20	Derrick legs	T
4	2 x 10	18	Derrick legs	T
4	2 x 10	18	Derrick legs, (doublers)	T
1	2 x 12	20	Derrick girts, (B. W.)	U
4	2 x 12	18	Derrick girts	U
4	1 x 12	18	Derrick girts	U
4	1 x 12	16	Derrick girts	U
*4	1 x 12	14	Derrick girts	U
*4	1 x 12	12	Derrick girts	U
4	1 x 12	10	Derrick girts	U
4	1 x 12	8	Derrick girts	U
4	1 x 12	6	Derrick girts	U
4	1 x 10	5	Derrick girts	U
8	2 x 8	20	Derrick braces	V
8	2 x 6	18	Derrick braces	V
8	1¼ x 6	16	Derrick braces	V
8	1¼ x 6	14	Derrick braces	V
8	1¼ x 6	12	Derrick braces	V
8	1¼ x 6	12	Derrick braces	V
8	1¼ x 6	10	Derrick braces	V
1	1 x 12	16	Derrick cornice	-----
5	1 x 12	20	Derrick cornice	-----
1	1 x 6	20	Derrick cornice	-----
1	2 x 8	16	Derrick cornice	-----
1	2 x 6	18	Reach	K 2
2	1 x 6	14	Reach	K 2
2	2 x 6	10	Beam frame	-----
1	1 x 12	6	Beam frame	-----
2	2 x 6	14	Beam braces	-----
3	2 x 8	16	Derrick roof	-----
2	2 x 10	16	Forge roof	-----
8	2 x 6	16	Sills, belt and engine houses	-----
2	2 x 6	12	Sills, belt and engine houses	-----
12	2 x 4	16	Plates, belt and engine houses	-----
4	2 x 4	12	Plates, belt and engine houses	-----
8	2 x 4	16	Ladder	W
2	2 x 4	10	Ladder	-----
--	1 x 12	16	Boards, 3000 feet	-----
28	1 x 12	16	10 foot band wheel	-----
14	1 x 12	12	10 foot band wheel	-----

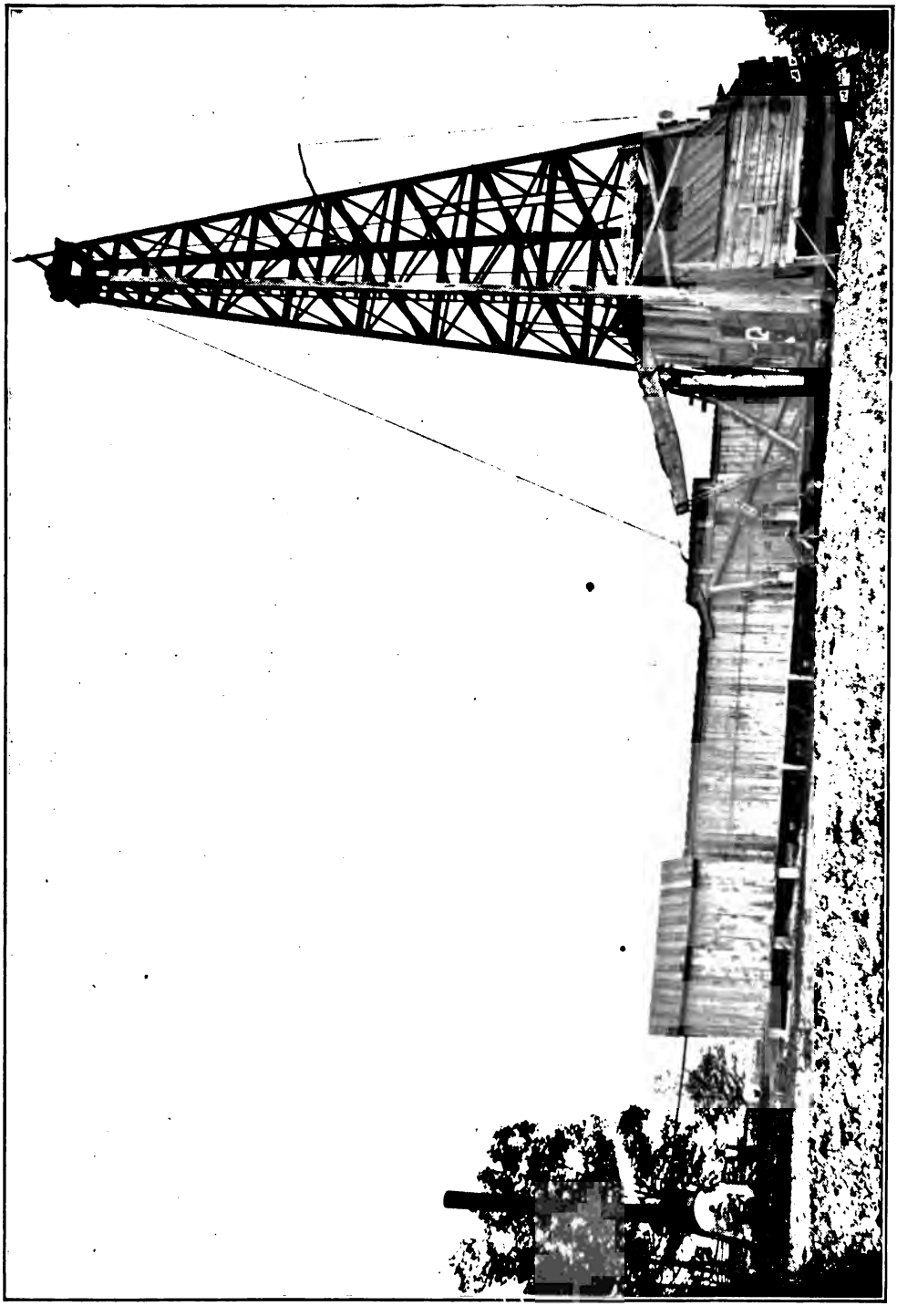
(Quarter moons, see page 63)

* These pieces should be oak or other hard wood. If hard wood is not obtainable, sizes must be increased according to quality of material.

† Pitman should be 5 inches square at top, and 5 x 10 inches at bottom.

Estimated weight, 57,000 pounds.

Fig. 1202



VIEW OF STANDARD 82-FOOT RIG IN ACTUAL USE

STANDARD RIG—HEAVY FOR DEEP WELL

TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG DERRICK 82 FEET HIGH, BASE 20 FEET SQUARE

The sizes of timber and lumber may be exceeded, but not diminished. If necessity compels the use of smaller sizes, the deficiency in strength must be supplied by extra bracing.

The references are to Fig. 1200, page 6.

Pieces	Size, inches	Length, feet	Name	Illustration marks
1	16 x 16	10	Nose sill	A
2	16 x 18	16	Mud sills	A 1, A 2
2	16 x 18	20	Mud sills	A 3, A 4
§ 1	18 x 18	31	Main sill	B
1	18 x 18	16	Sub sill	C
1	14 x 14	16	Sand reel tail sill	D
6	16 x 18	4	Derrick foundation posts	N
2	10 x 10	21	Derrick sills	0, 0 1
2	16 x 18	14	Engine mud sills	m-m 1
2	16 x 16	12	Engine pony sills	1-1, 1 2
1	20 x 24	9	Engine block	1
2	8 x 10	25	Bumpers, engine block to mud sill	n
6	10 x 10	21	Derrick floor sills	P to P 5
20	2 x 12	20	Derrick floor	Q
1	16 x 16	16	Samson post	I
2	6 x 8	14	Samson post braces	I-1, I-4
1	6 x 8	16	Samson post brace	I-2
1	6 x 8	12	Samson post brace	I-3
* 3	3 x 5	16	Keys	- - - -
* 1	16 x 18	16	Front and rear jack posts, and knuckle post	G, H E
* 1	4 x 12	5	Jack post caps	- - - -
2	6 x 8	16	Jack post braces	- - - -
* 1	12 x 14	5	Tail post	F
* 1	14 x 14	22	Bull wheel posts	R 1, R 2
1	6 x 8	14	Bull wheel post brace	R 3
* 1	9 x 10	14	Sand reel lever and dead block	K 1
* 1	2 x 6	6	Sand reel handle	K 3
‡ 1	14 x 26	26	Walking beam	J
1	6 x 8	14	Headache post	S
* 1	5 x 12	12	Pitman †	M
* 1	5 x 14	16	Crown block	X
* 1	3 x 14	10	Sand sheave pulley block	Y
* 1	2 x 14	5	Adjuster board	J 1
65	2 x 8	16	Derrick legs, corners, and doublers	T
24	2 x 10	16	Derrick corners, crown, and water table	- - - -
4	2 x 10	18	Starting legs	- - - -
1	18 x 18	14	Bull wheel shaft	R
65	1⅛ x 12	16	Derrick girts and band wheel	- - - -
10	2 x 12	18	Derrick bottom girts	- - - -
18	2 x 6	18	Derrick bottom braces	- - - -
80	1 x 6	16	Derrick braces and roof batting	- - - -
17	2 x 4	16	Ladder and arms for sand reel	- - - -
3	2 x 6	16	Sand reel reach and handle	- - - -
5	2 x 4	12	Top frame for engine house	- - - -
4	2 x 6	12	Bottom frame for engine house	- - - -
5	2 x 12	20	Plank (extra)	- - - -
- -	1	18	Boards, 500 feet	- - - -
- -	1	16	Boards, 2000 feet	- - - -
- -	1	10	Boards (belt house siding), 500 feet	- - - -
- -	1	9	Boards (extra), 500 feet	- - - -
4	2 x 8	20	Plank (extra)	- - - -

If closed or winter rig is desired, add 500 feet, 1 inch by 18 foot boards.

* These pieces should be oak or other hard wood. If hard wood is not obtainable, sizes must be increased according to quality of material.

§ The main sill may be sawed in two pieces, 16 and 18 feet in length, with 2-foot splice.

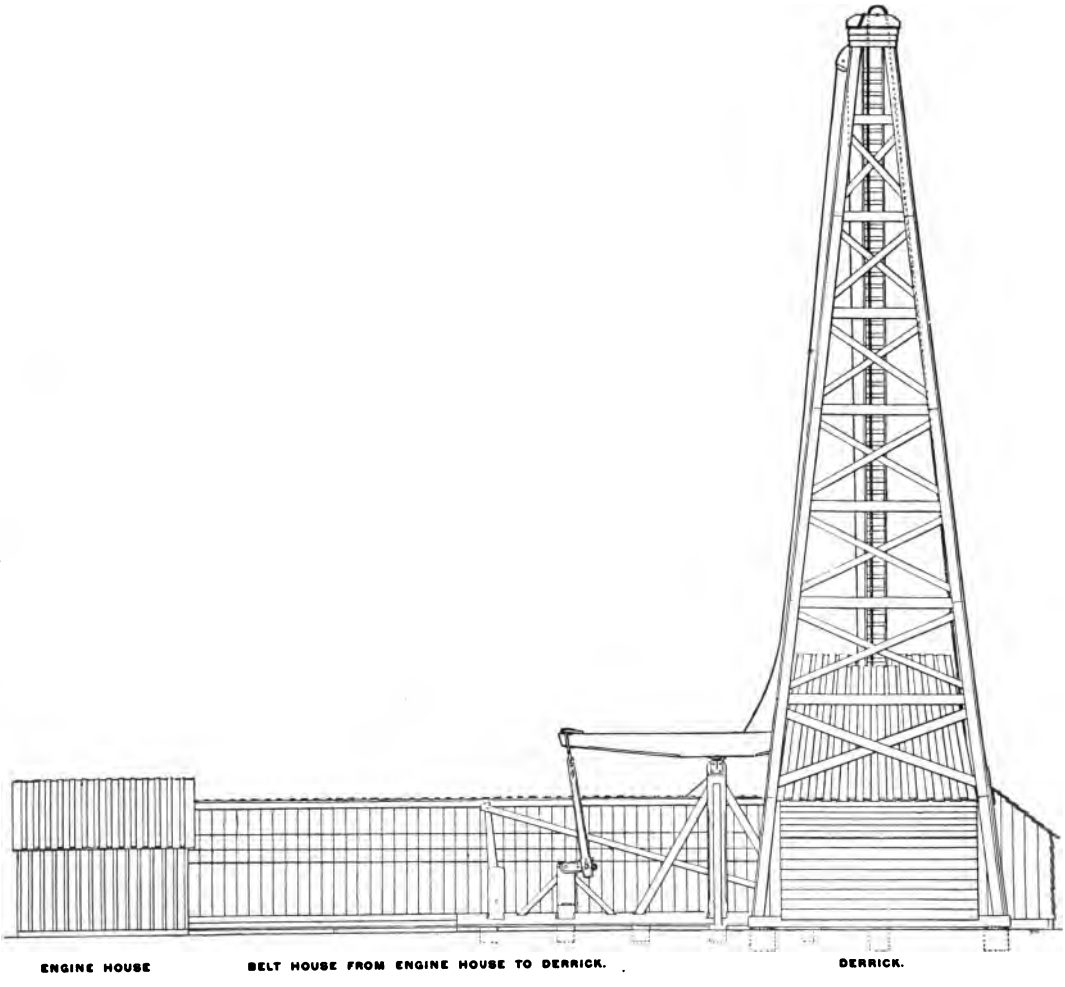
† Pitman should be 5 inches square at top, and 5 x 12 inches at bottom.

‡ The walking beam should be 14 inches square at each end, the taper beginning 3 feet on each side from center.

Estimated weight, 67,000 pounds.

CLOSED RIG

Fig. 1201



The lower part of the derrick is enclosed to protect the machinery and workmen from cold or stormy weather

DERRICK STAYS

ANDERSON'S PATENT

A set consists of 4 levers, 4 loops, 4 stakes, 4 rings, and 40 lbs. of No. 6 iron wire. Per set, $5 00

If stakes are not wanted, deduct 40 cents.

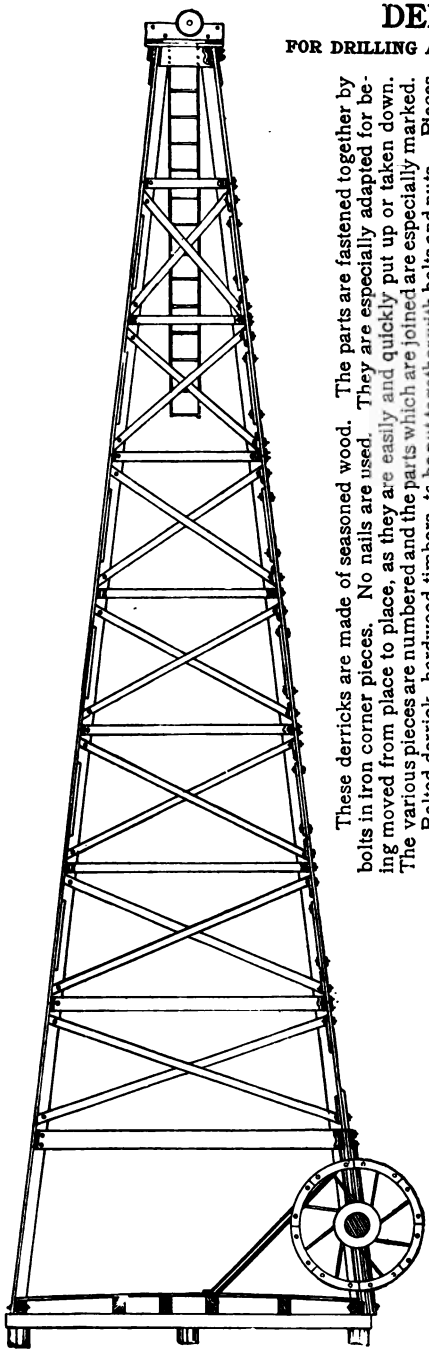
4 loops, 4 levers, and 4 rings - 2 00

Fig. 1222

COMPLETE BOLTED DERRICK

FOR DRILLING AND PUMPING WELLS

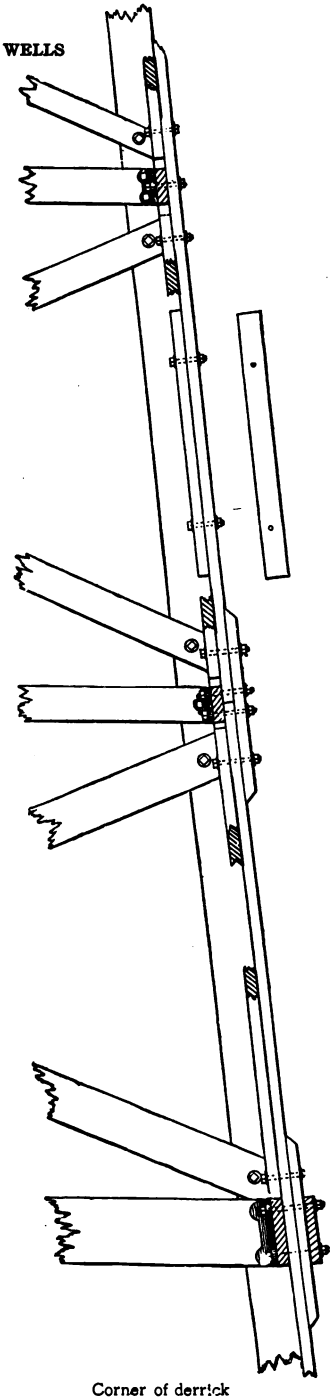
Fig. 1223



72 feet high

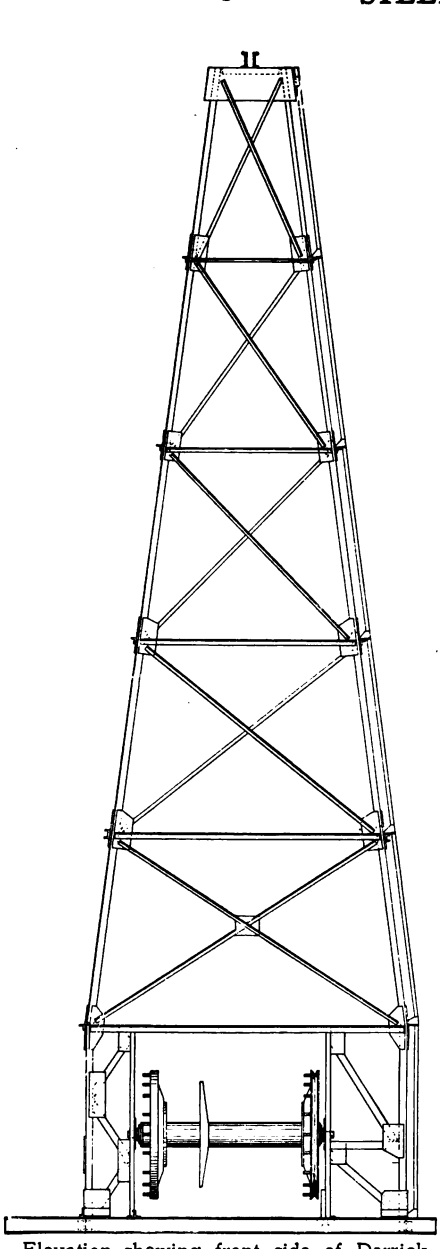
These derricks are made of seasoned wood. The parts are fastened together by bolts in iron corner pieces. No nails are used. They are especially adapted for being moved from place to place, as they are easily and quickly put up or taken down. The various pieces are numbered and the parts which are joined are especially marked.

Bolted derrick, hardwood timbers, to be put together with bolts and nuts. Pieces framed and numbered ready to be put up. This includes bull and band wheel, sand pump reel, 3½-inch rig iron, nails, brake, band, lever, staple and back brake. Everything complete, ready to put up. 72 feet high - - - - - - - - price, $850 00
The same, with 4-inch irons and 82 feet high - - - - - - - - - - 900 00
Fig. 1222, derrick only, made of pine lumber, 72 feet high - - - - - - 300 00

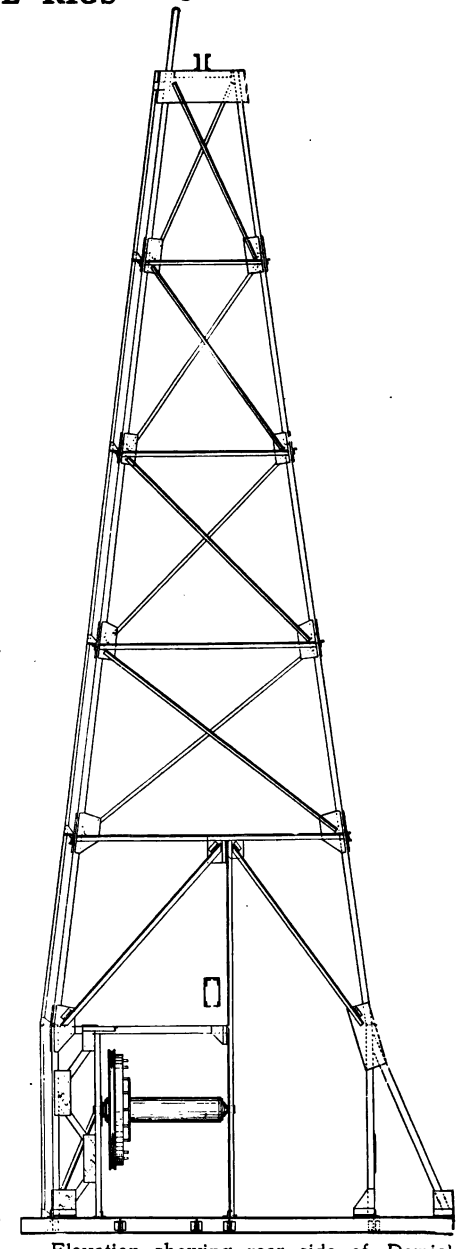


Corner of derrick

Fig. 1231 **STEEL RIGS** Fig. 1232



Elevation showing front side of Derrick with Bull Wheels, and construction of Bull Wheel hangers and bracing.

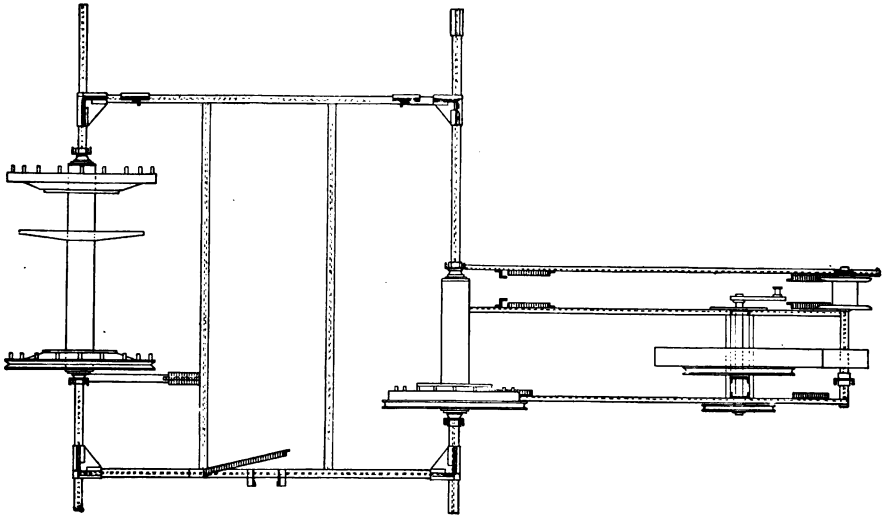


Elevation showing rear side of Derrick with Calf Wheel, and construction of Calf Wheel hangers and bracing.

Full prints showing detail of Ladder side and Forge House side of derrick are supplied to all purchasers.

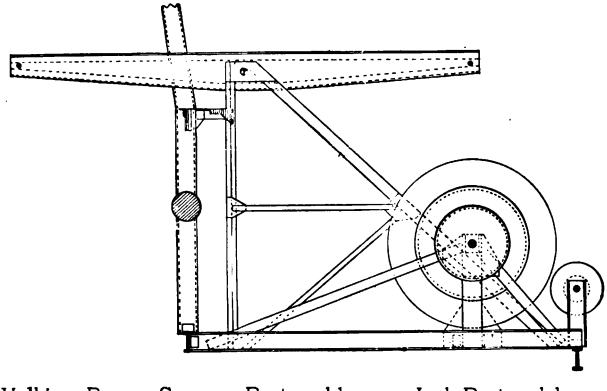
STEEL RIGS

Ground Plan, Fig. 1233



Showing Base, Bull Wheels and Calf Wheel with hangers, Band Wheel, Tug Pulley, Outer Tug Pulley for Calf Wheel and Sand Reel.

Elevation, Fig. 1234



Showing Walking Beam, Samson Post and braces, Jack Post and braces, Band Wheel, Tug Pulley, Outer Tug Pulley for Calf Wheel, section of Calf Wheel Shaft and Sand Reel.

STEEL RIGS

Our Steel Rigs were designed by competent engineers who are acquainted with the actual requirements.

These Rigs are easily erected and are practically indestructible.

The question of obtaining sound timber of suitable size for rigs is fast becoming a serious one, and at no distant day the price will be prohibitive.

The steel rig is lighter than the wooden rig and the cost of transportation is correspondingly less.

In order to meet varying requirements, the steel rig has been designed so that it may be supplied in part or as a whole. We can furnish the derrick only which can be supported on any foundation to suit purchaser, or the derrick with steel foundation; or the derrick with foundation and main sill with steel samson post and walking beam and steel sand reel. In all cases the bull wheels and band wheel will be built up of wood. Then when required the California style Calf Wheels may be added as the rig is arranged for hanging them. A steel frame is also furnished for supporting roof to derrick and covering to band wheel and belt.

The various divisions and weights are scheduled as follows:

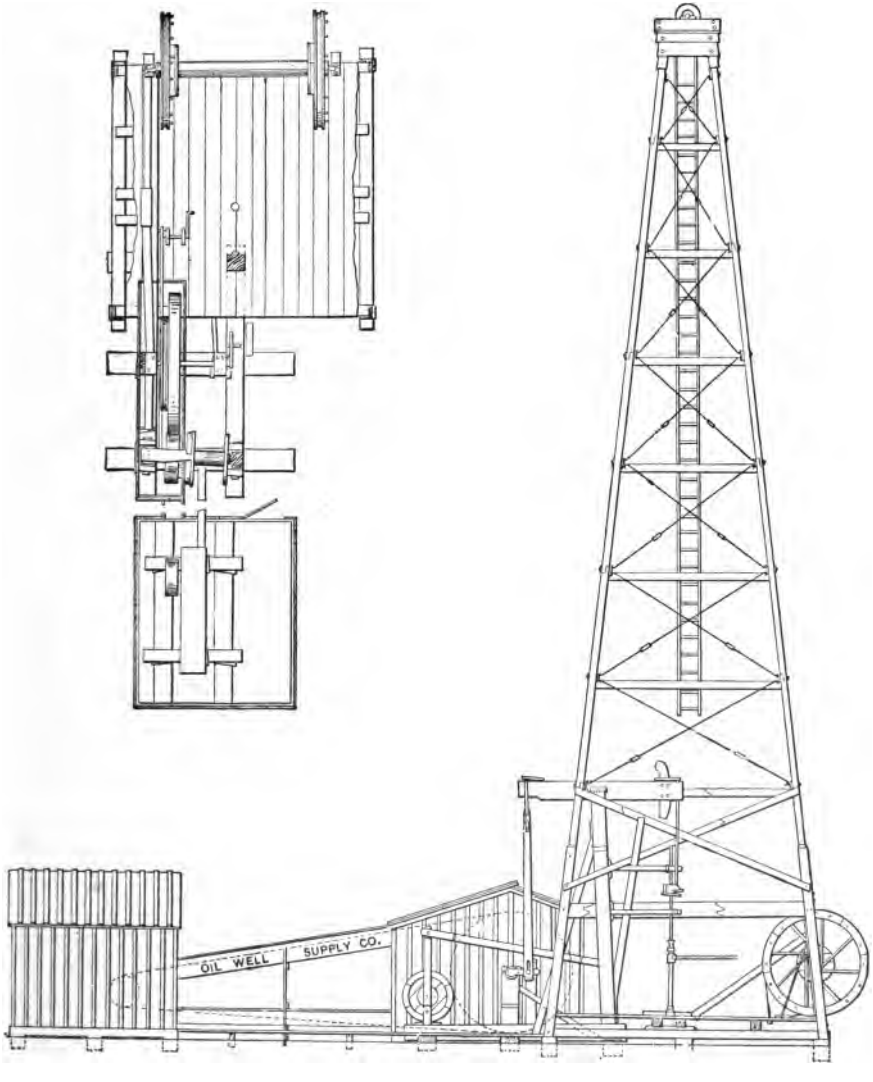
	Weight, lbs.
Derrick without base	16,000
Base	4,700
Walking Beam, Jack Post, Samson Post, Knuckle Post, etc	7,500
Framing of house	2,800
Ladder	750
30 Squares Corrugated Iron	2,910
1 set Band Wheel Cants (complete) 1 set Bull Wheel Cants (complete)	746
Shaft, Crank, Wrist Pin and Flanges	552
1 California Iron Sand Reel	1,372
1 24-inch Sand Line Pulley	90
1 30-inch Crown Pulley	280
1 Oak Bull Wheel Shaft	1,144
1 Engine Block	800
Calf Wheel Adjunct	2,864
Total Weight	42,508

Derrick 72 feet high; 20 foot Base.

SIDE ELEVATION AND GROUND PLAN OF RIG

With straight line sand reel and short segment walking beam, chain and clevis, arranged for pumping; two mud sills; turnbuckle braces, legs of derrick of square timbers.

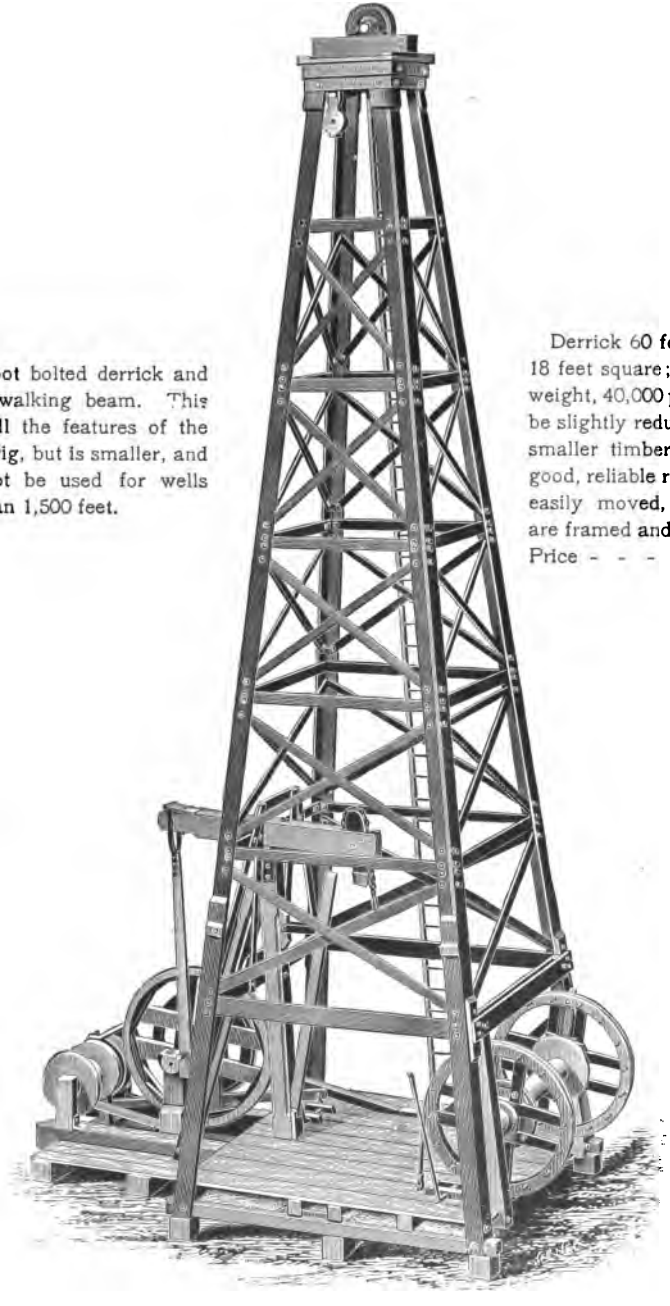
Fig. 1240



A COMPACT, STRONG, AND DURABLE RIG

Fig. 1243

Sixty-foot bolted derrick and segment walking beam. This rig has all the features of the standard rig, but is smaller, and should not be used for wells deeper than 1,500 feet.



Derrick 60 feet high, base 18 feet square; approximate weight, 40,000 pounds. Can be slightly reduced by using smaller timbers. This is a good, reliable rig, and can be easily moved, as all parts are framed and bolted.

Price - - - - - $600 00

Fig. 1207A

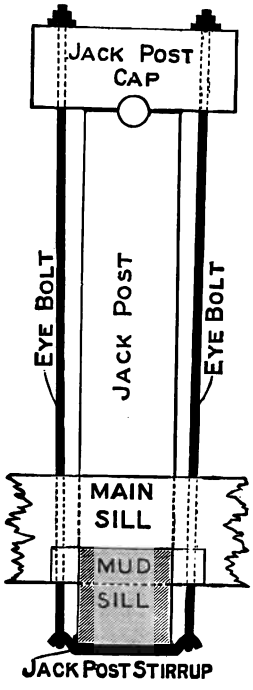
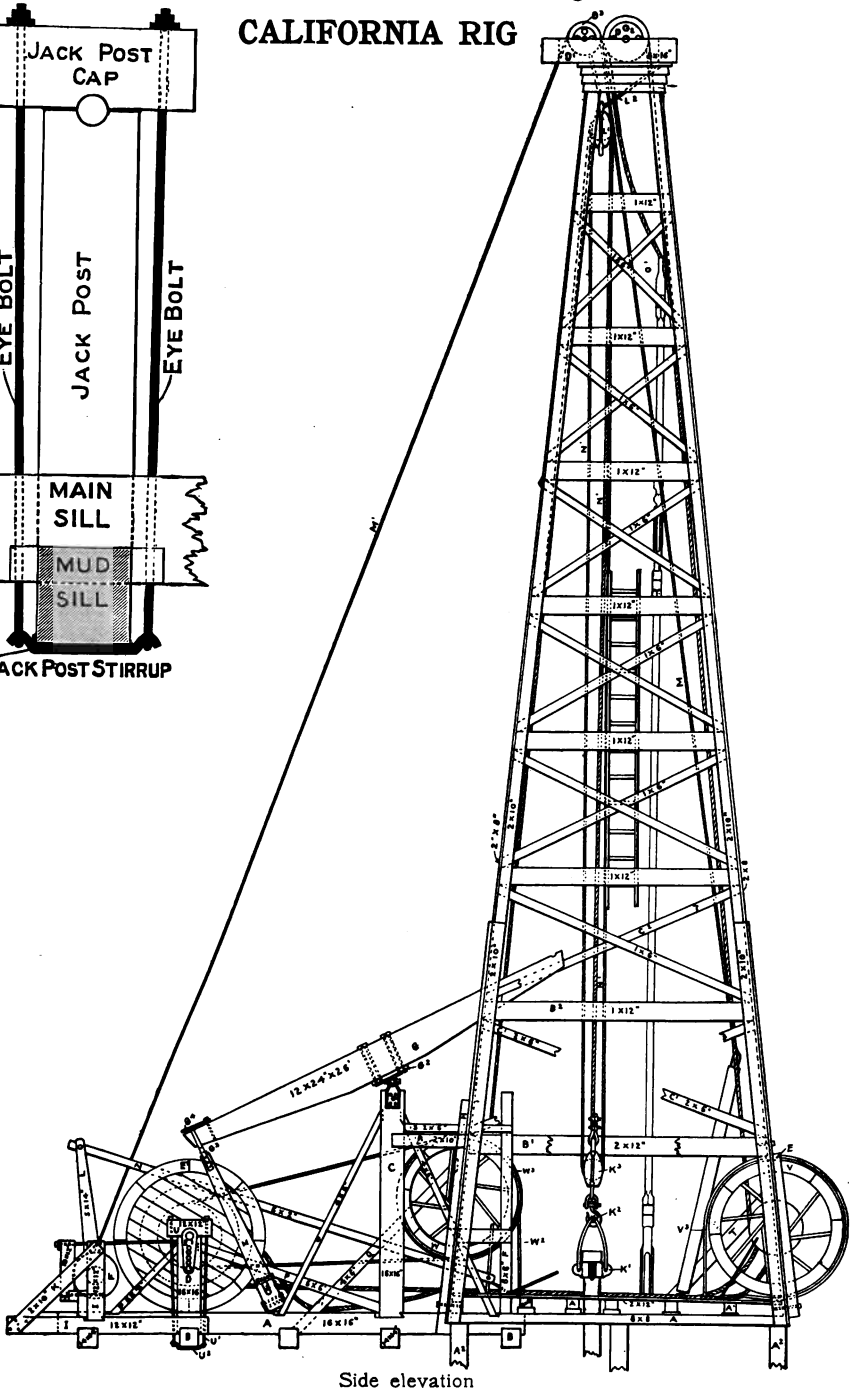


Fig. 1207

CALIFORNIA RIG



Side elevation

PLAN OF CALIFORNIA RIG, SHOWING CALF WHEEL

Fig. 1206

The California Rig, as its name implies, first came into general use in California, where the peculiar nature of the strata required a secondary reel for handling the casing. This secondary reel, or Calf Wheel, as it is called, is operated by a tug rope passing over a cast-iron rim attached to the built-up side of the wheel and passing over a grooved wheel keyed on to the outer end of the main rig iron shaft. A steel sand reel is always used with this rig.

For prices of special reels and irons, see pages 65, 66 and 67.

CALIFORNIA RIG

SPECIFICATION OF TIMBER AND LUMBER

No. Pieces	Dimensions	FOR	No. Feet
1	16 in. x 16 in. x 22 ft.	Bull wheel shaft (13 ft.), calf wheel shaft (9 ft.)	469
1	16 in. x 16 in. x 28 ft.	Main sill	597
2	16 in. x 16 in. x 14 ft.	Samson post, jack and knuckle posts	598
1	16 in. x 16 in. x 18 ft.	Sub sill	384
4	14 in. x 14 in. x 16 ft.	Mud sills	1,045
1	24 in. x 24 in. x 8 ft.	Engine block	384
1	12 in. x 12 in. x 24 ft.	Tail sill and post, back brake and cap	288
1	12 in. x 12 in. x 16 ft.	Engine pony sills	192
2	12 in. x 12 in. x 12 ft.	Engine mud sills	288
1	12 in. x 12 in. x 24 in. x 26 ft.	Walking beam	624
2	10 in. x 12 in. x 24 ft.	Bull wheel and calf wheel posts	480
1	10 in. x 10 in. x 12 ft.	Boiler hanger	100
1	8 in. x 8 in. x 12 ft.	Top cap or plate	64
1	8 in. x 8 in. x 14 ft.	Crane post	75
10	8 in. x 8 in. x 20 ft.	Mud sills, floor joists, and posts	1,068
1	6 in. x 6 in. x 2 ft.	Oak, pitman (sand reel lever)	6
3	6 in. x 6 in. x 14 ft.	Headache post, back brake, jack post braces	126
1	6 in. x 6 in. x 20 ft.	Bunting post	60
2	5 in. x 5 in. x 12 in. x 12 ft.	Pitman and sand reel swing lever	50
1	4 in. x 10 in. x 14 ft.	Boiler hanger	47
2	4 in. x 6 in. x 14 ft.	Roof rafters (derrick)	56
9	4 in. x 6 in. x 16 ft.	Braces and keys	288
2	2 in. x 16 in. x 16 ft.	Crown block	85
3	2 in. x 16 in. x 12 ft.	Crown block	96
45	2 in. x 12 in. x 20 ft.	Walk, first girts and floor, forge house floor	1,800
4	2 in. x 10 in. x 24 ft.	Derrick leg doublers	160
2	2 in. x 10 in. x 20 ft.	Samson post side braces	67
4	2 in. x 10 in. x 18 ft.	Derrick long starting legs	120
14	2 in. x 10 in. x 16 ft.	Derrick long legs	373
4	2 in. x 8 in. x 20 ft.	Derrick short starting legs	107
19	2 in. x 8 in. x 16 ft.	Derrick legs, water table, and gin pole	405
10	2 in. x 6 in. x 20 ft.	First braces, forge house floor joists	200
1	2 in. x 6 in. x 16 ft.	Bull wheel spool arms	16
10	2 in. x 4 in. x 20 ft.	Housing for bull wheel, engine, and rig	134
4	2 in. x 4 in. x 12 ft.	Housing for bull wheel, engine, and rig	32
6	2 in. x 4 in. x 18 ft.	Forge house joists and rafters	72
4	2 in. x 4 in. x 16 ft.	Derrick roof frame	43
8	2 in. x 3 in. x 16 ft.	Derrick ladder	64
152	1 in. x 12 in. x 20 ft.	Girts, crown, forge house sides, housing for bull wheel and engine house	3,040
100	1 in. x 12 in. x 16 ft.	Derrick roof and housing for bull wheel and engine house	1,600
10	1 in. x 12 in. x 14 ft.	Boiler siding	140
50	1 in. x 6 in. x 18 ft.	Derrick braces	450
		Total number of feet	16,293

Estimated shipping weight, 55,000 pounds.

HYDRAULIC ROTARY RIG

(Not illustrated)

This rig is a plain derrick without any of the adjuncts of bull wheels, band or tug wheels. The engine is set close to the derrick and drives the hoisting gear and the rotary table by means of a chain transmission passing over sprocket gear wheels.

The derrick may be 20 feet base and 57 feet high, or 22 feet base and 72 feet high.

SPECIFICATIONS OF LUMBER FOR ROTARY DERRICK

FOR DERRICK 72 FEET HIGH

4 pieces	10 x 10 in. x 22 ft.	for sills
10 pieces	2 x 12 in. x 22 ft.	for floor joists
35 pieces	2 x 8 in. x 22 ft.	for floor
4 pieces	2 x 12 in. x 40 ft.	for legs
4 pieces	2 x 12 in. x 34 ft.	for legs
4 pieces	2 x 10 in. x 40 ft.	for legs
4 pieces	2 x 10 in. x 34 ft.	for legs
4 pieces	2 x 12 in. x 20 ft.	for girts
4 pieces	2 x 12 in. x 18 ft.	for girts
4 pieces	2 x 12 in. x 16 ft.	for girts
4 pieces	2 x 12 in. x 14 ft.	for girts
4 pieces	2 x 12 in. x 12 ft.	for girts
4 pieces	1 x 12 in. x 10 ft.	for girts
2 pieces	1 x 12 in. x 16 ft.	for girts
2 pieces	1 x 12 in. x 12 ft.	for girts
1 piece	1 x 12 in. x 16 ft.	for girts
8 pieces	1 x 6 in. x 20 ft.	for braces
8 pieces	1 x 6 in. x 18 ft.	for braces
8 pieces	1 x 6 in. x 16 ft.	for braces
8 pieces	1 x 6 in. x 14 ft.	for braces
8 pieces	1 x 6 in. x 14 ft.	for braces
8 pieces	1 x 6 in. x 12 ft.	for braces
4 pieces	1 x 6 in. x 18 ft.	for braces
4 pieces	1 x 6 in. x 14 ft.	for braces
1 piece	2 x 12 in. x 12 ft.	for pulley blocks
2 pieces	4 x 4 in. x 10 ft.	for pulley blocks
144 lineal feet	2 in. x 4 in.	for ladder
144 lineal feet	1 in. x 4 in.	for ladder

Total, 4,625 feet. 100 lbs. nails.

Estimated weight, 18,000 lbs.

FOR DERRICK 57 FEET HIGH

4 pieces	10 x 10 in. x 20 ft.	for sills
8 pieces	2 x 12 in. x 20 ft.	for floor joists
32 pieces	2 x 8 in. x 20 ft.	for floor
4 pieces	2 x 12 in. x 32 ft.	for legs
4 pieces	2 x 12 in. x 28 ft.	for legs
4 pieces	2 x 10 in. x 32 ft.	for legs
4 pieces	2 x 10 in. x 28 ft.	for legs
4 pieces	2 x 12 in. x 18 ft.	for girts
4 pieces	2 x 12 in. x 16 ft.	for girts
4 pieces	2 x 12 in. x 14 ft.	for girts
4 pieces	2 x 12 in. x 12 ft.	for girts
4 pieces	1 x 12 in. x 12 ft.	for girts
2 pieces	1 x 12 in. x 18 ft.	for girts
2 pieces	1 x 12 in. x 14 ft.	for girts
2 pieces	1 x 12 in x 10 ft.	for girts
1 piece	1 x 12 in. x 16 ft.	for girts
8 pieces	1 x 6 in. x 18 ft.	for braces
8 pieces	1 x 6 in. x 16 ft.	for braces
8 pieces	1 x 6 in. x 14 ft.	for braces
8 pieces	1 x 6 in. x 12 ft.	for braces
8 pieces	1 x 6 in. x 12 ft.	for braces
8 pieces	1 x 6 in. x 10 ft.	for braces
4 pieces	1 x 6 in. x 16 ft.	for braces
4 pieces	1 x 6 in. x 12 ft.	for braces
1 piece	2 x 12 in. x 12 ft.	for pulley blocks
2 pieces	4 x 4 in. x 10 ft.	for pulley blocks
114 lineal feet	2 in. x 4 in.	for ladder
114 lineal feet	1 in. x 4 in.	for ladder

Total, 3.892 feet. 95 lbs. nails.

Estimated weight, 15,000 lbs.

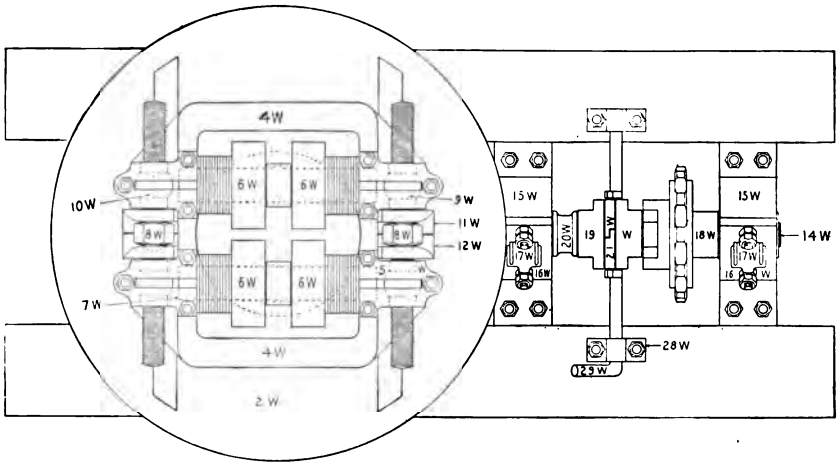
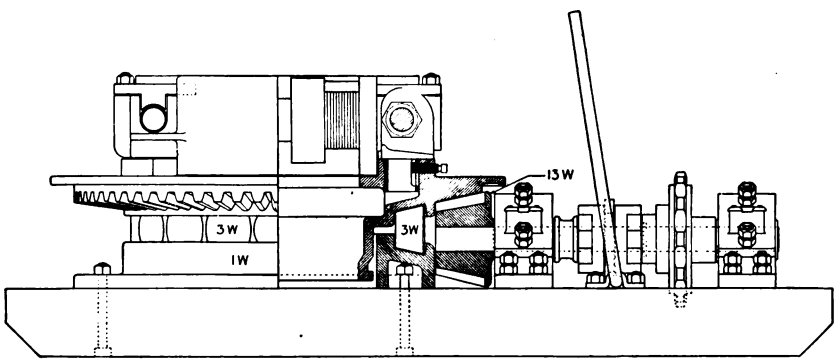


Fig. 2211

O. W. S. Rotary

These machines are designed and built to withstand the hard usage incident to the process.

Size	PIPE HANDLED		WT.	PRICE.
Inches	Max.	Min.	Lbs.	
6	6	1½	900	$225.
12	12	2	1900	400.
18	18	4	2800	600.



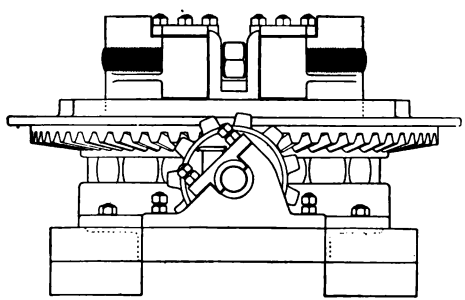
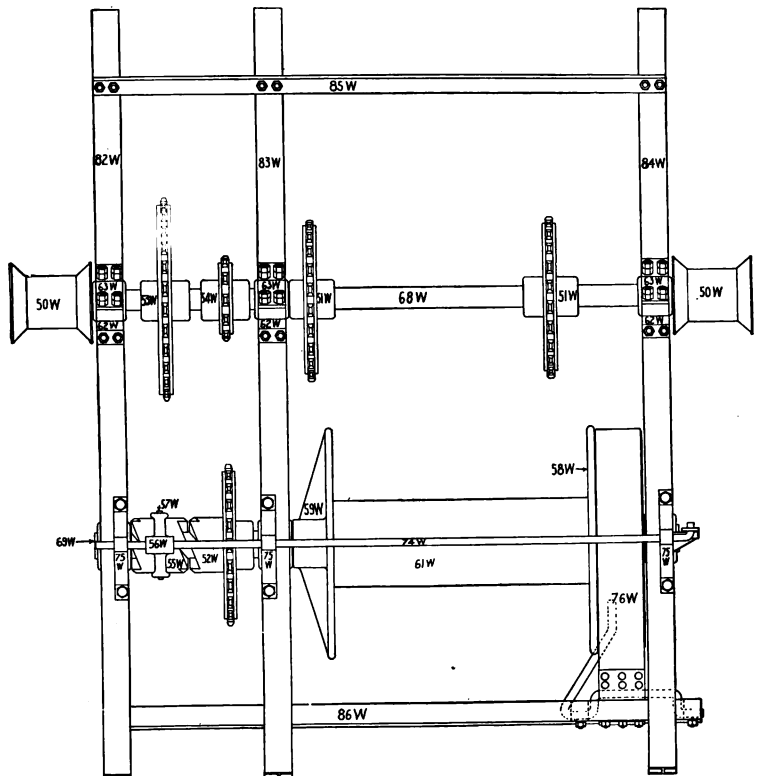
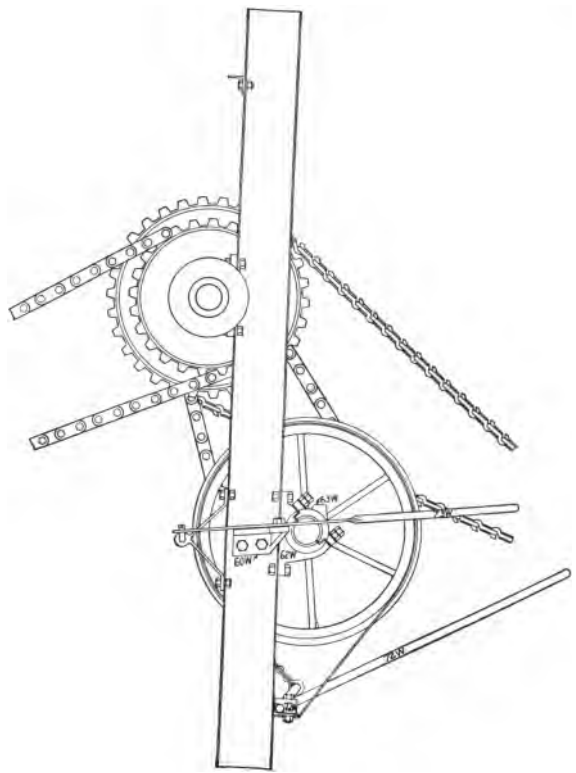


Fig. 2212.





O. W. S. Rotary Hoist

Built of steel and iron. Strong and easily handled.

Weight 2,000 lbs.

Price - - - - - - - - - - $250.00

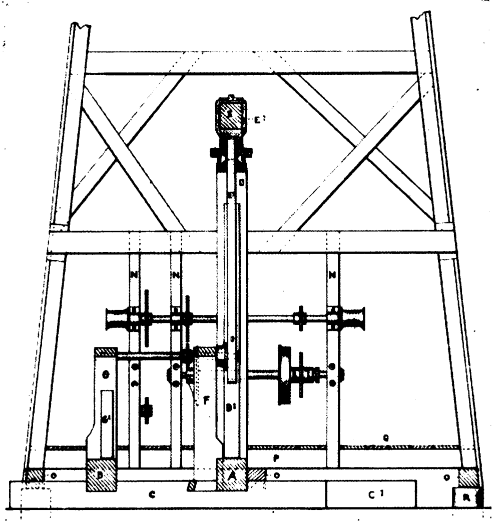
COMBINATION RIG

(Patented)

FOR CABLE TOOLS AND HYDRAULIC ROTARY

Equally effective with either system

Fig. 1271



End view of Combination Rig

This rig embodies the principles of both the standard Cable Rig and the Hydraulic Rotary Rig. With the Combination Rig it is possible to drill through any formation.

The Cable Tools may be used to drill through hard strata whenever encountered.

The Walking Beam is mounted on a revolving center support, and when found desirable to use the Rotary Tools the Beam is swung aside, thus permitting the free passage of the hoisting lines to the drum.

The accompanying illustrations show the construction and alignment of the parts.

REVOLVING CENTER IRONS FOR COMBINATION RIG

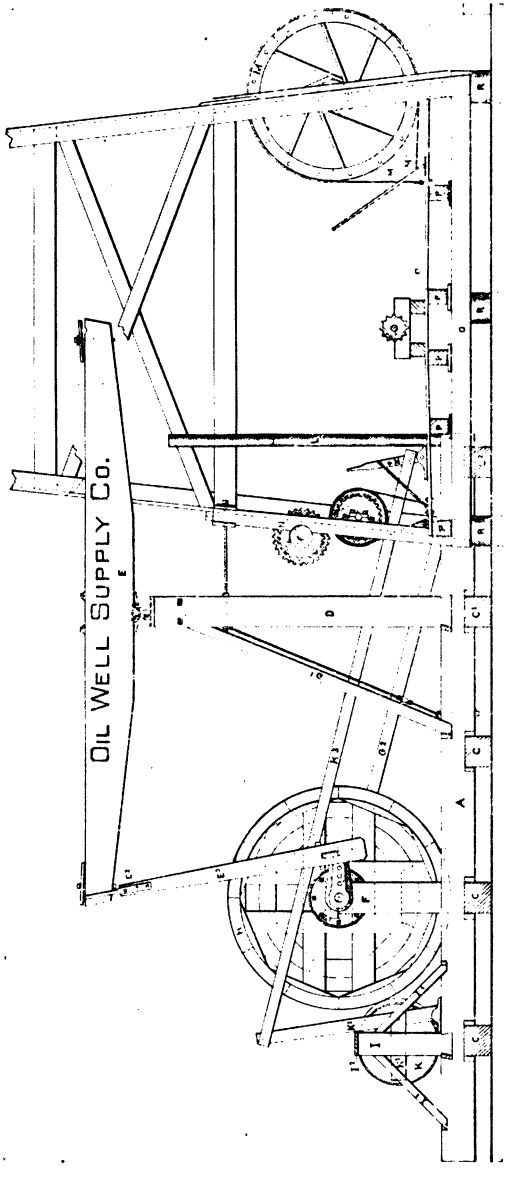
Fig. 2237

Complete - $50 00

Weight, 315 lbs.

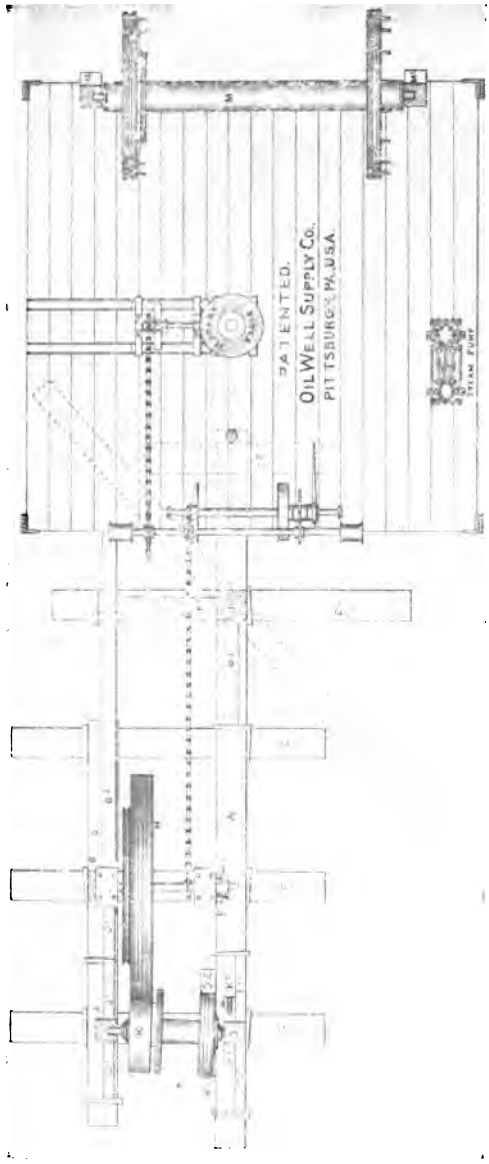
COMBINATION RIG

Fig. 1272



Side elevation

Fig. 1273



Ground-plan

COMBINATION RIG

	Weight, lbs.	Price
Complete Combination Rig consisting of All timbers squared and framed Bolted derrick, 72 feet high Sectional bull wheels Sectional band and tug wheel Corbett patent sand reel Walking beam with patent revolving center irons	50,000	$1,000 00
Hoisting apparatus, fig. 2212, page 22	2,000	250 00
12-inch rotary table, fig. 2211, page 21	1,900	400 00
100 ft. No. 103 sprocket chain, fig. 2200	400	62 00
4-20 inch bushed derrick pulleys, fig. 2204, see page 55	250	48 00
1 sprocket wheel for main shaft	100	10 00
Total	54,650	$1,770 00

Specifications for Timbers and Lumber with Blue Prints showing construction supplied to purchasers.

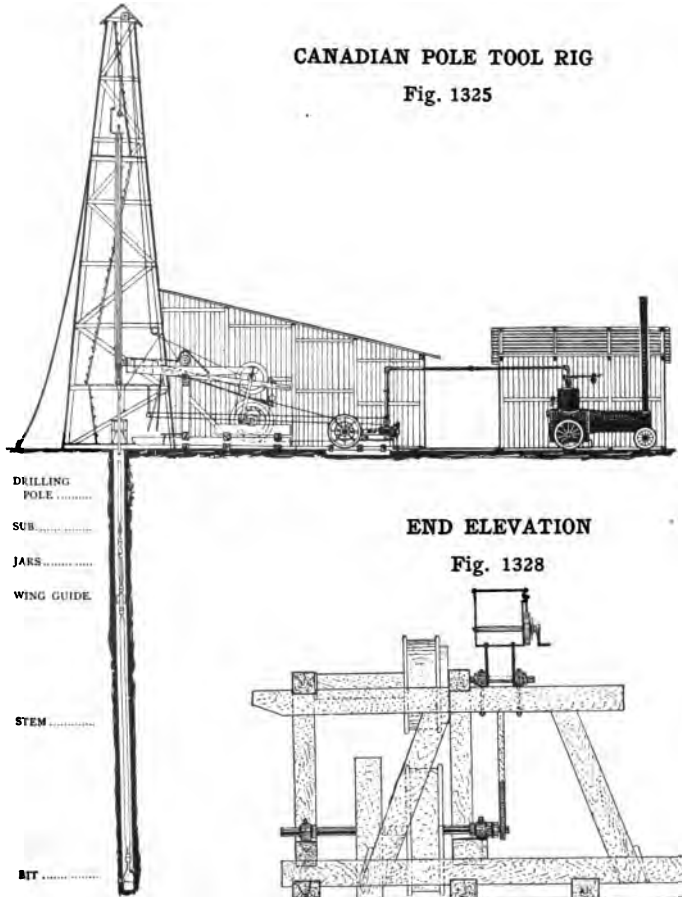
For detailed prices of parts of Rig Irons, Bull Wheels, Band Wheels, etc., see index.

For detailed prices of Hydraulic Tools, see pages 189-192.

Any outfit of Cable Tools may be used with this Rig.

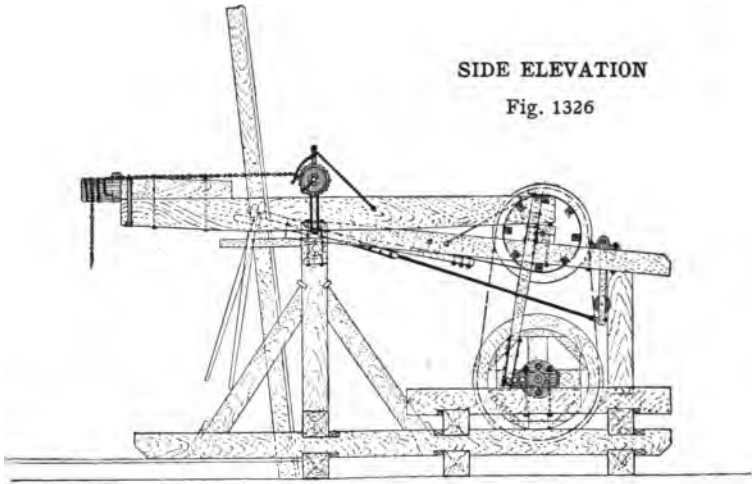
CANADIAN POLE TOOL RIG

Fig. 1325

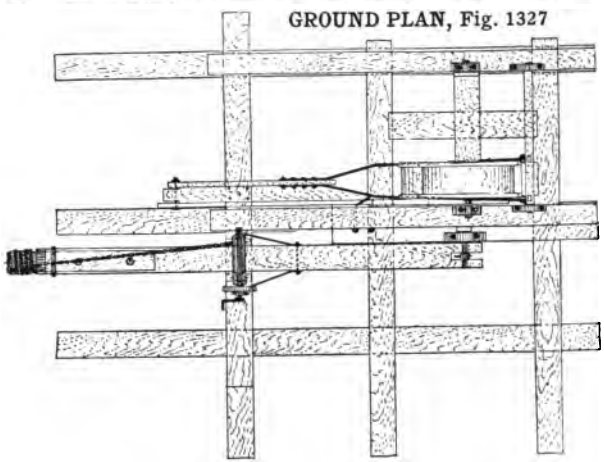


SIDE ELEVATION

Fig. 1326

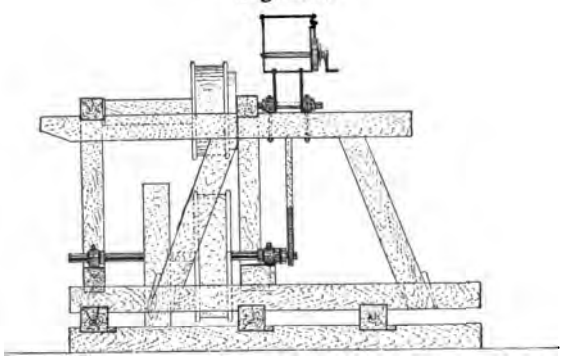


GROUND PLAN, Fig. 1327



END ELEVATION

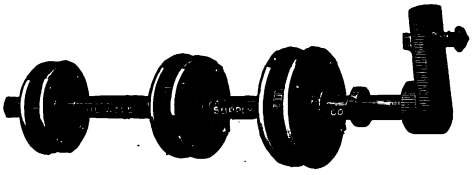
Fig. 1328



CANADIAN POLE TOOL RIG PARTS

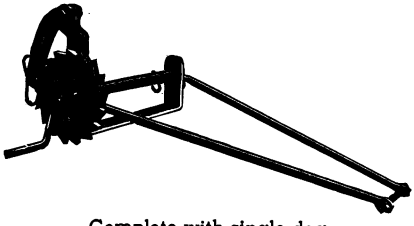
DRIVE WHEEL
Fig. 2001

SHAFT, CRANK, AND FLANGES
Fig. 2000



SPOOL
Fig. 2002

SLIPPER OUT
Fig. 2025



Complete with single dog

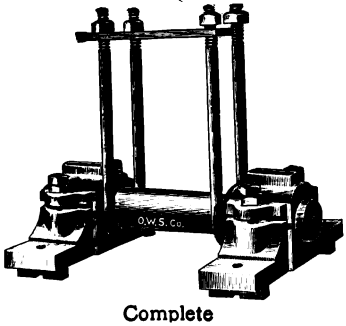
JACKET
Fig. 2034

For spring pole

DOUBLE DOG
Fig. 2027

For slipper out

CENTER IRONS
Fig. 2031



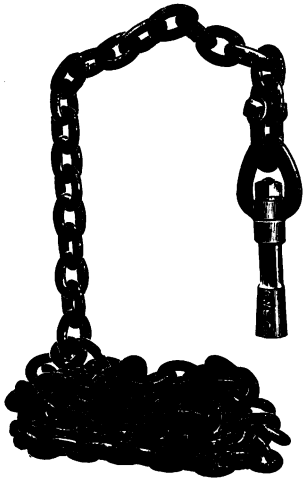
Complete

KING BOLT
Fig. 2039

BEAM YOKE BOLT
Fig. 2036

CANADIAN POLE TOOL RIG PARTS

DRILL CHAIN AND SWIVEL
Fig. 2050



COW SUCKER
Fig. 2052

Complete

SPOOL CHAIN AND SWIVEL
Fig. 2055

PITMAN STRAPS AND BRASSES
Fig. 2045

WRIST PIN
Fig. 2042

NODDLE PIN STAPLE
Fig. 2047

The pole tool system is still in use in the oil district of Ontario, Canada, but it has been supplanted by the cable system in all the great oil fields of the United States.

For illustrations of Canadian tools, see pages 194 to 197.

For prices of drill poles and joints, see page 193.

THE KNUPP RIG

Fig. 1278

For description and price see next page.

THE KNUPP RIG

Reproduced from photograph of Rig in operation, drilling at a depth of 3,500 feet.

The Knupp Rig illustrated on page 29 is made in various sizes with derricks ranging in height from 48 to 72 feet.

The standard size rig has a 72 foot derrick, the main standards of which are 7x9 inch timbers. This rig is fitted with regular band wheel, bull wheels and rig irons as are required to do the work in the different oil or gas fields.

The trussed main sills and derricks are shipped in sections of suitable size for convenient handling and with all necessary bolts, washers and special irons for erecting.

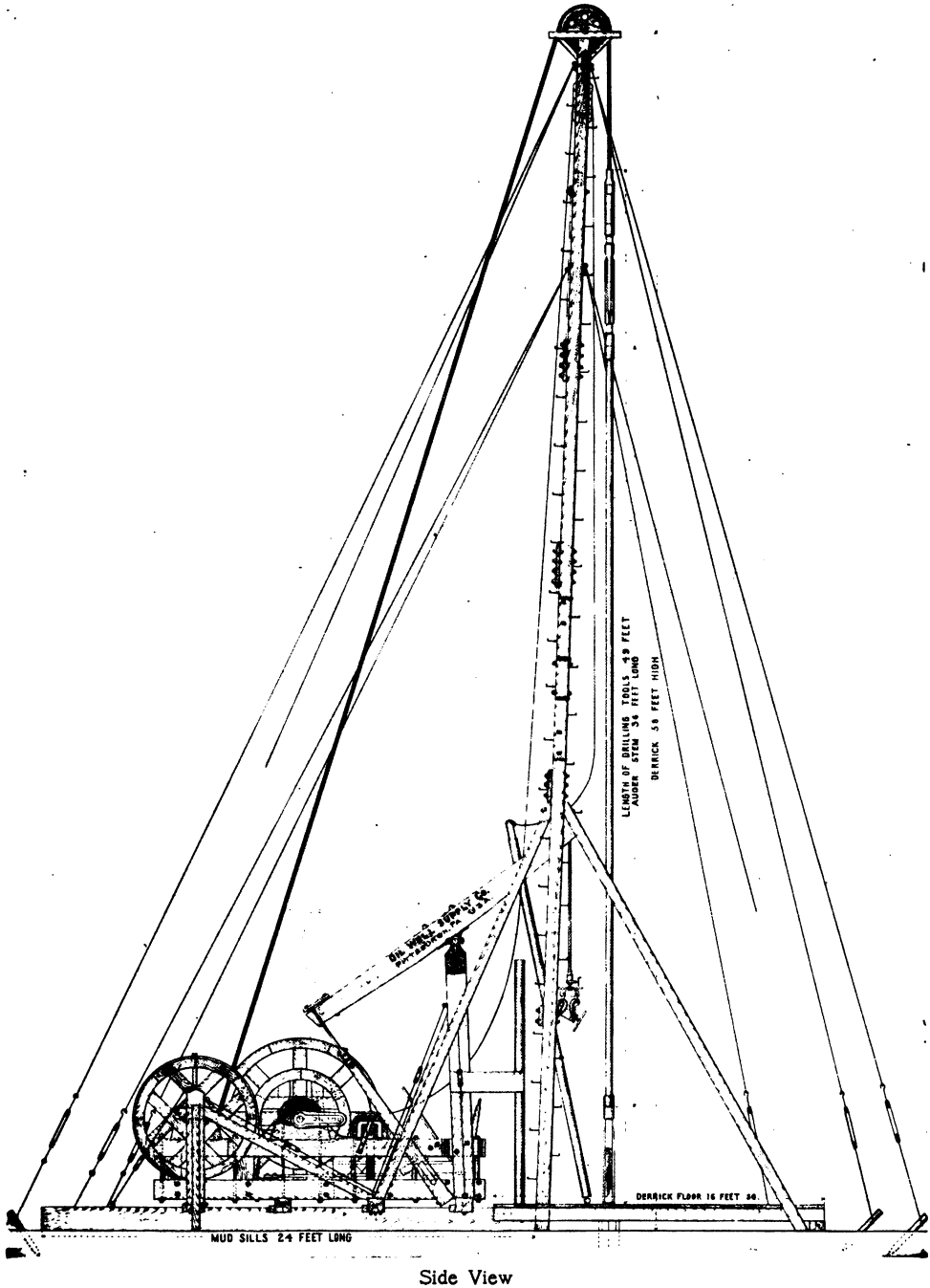
The derricks should be put together extended on the ground and hoisted by using one of the corner braces for a gin pole. The brace is fitted with ring bolts for this purpose.

The guy wires are half-inch galvanized wire fastened to top of derrick and to foundation with eye bolts and fitted with turn-buckles for adjusting.

Price of complete rig for deep drilling, with 72 foot derrick, 4½ inch rig irons, 10 foot band wheel and iron sand reel - - - - - - - - - - - - - - - - - - - $700 00

PARKERSBURG RIG

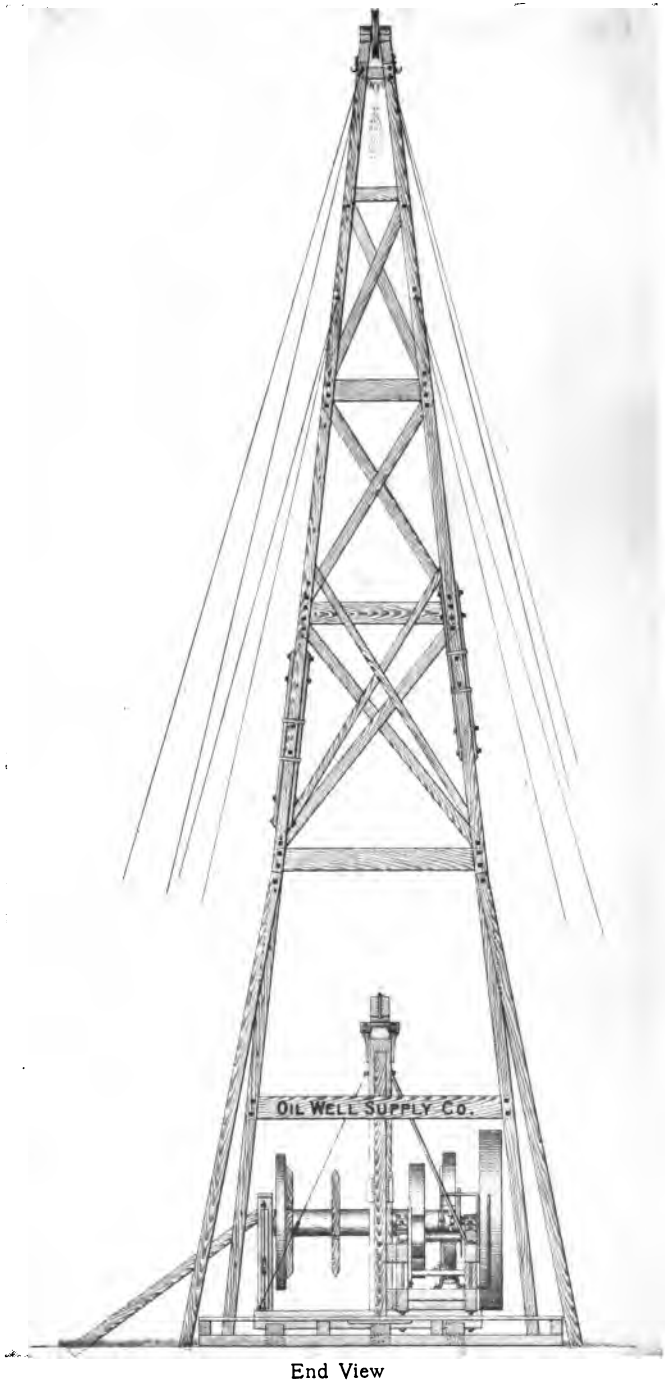
Fig. 1316



Side View

PARKERSBURG RIG

Fig. 1317



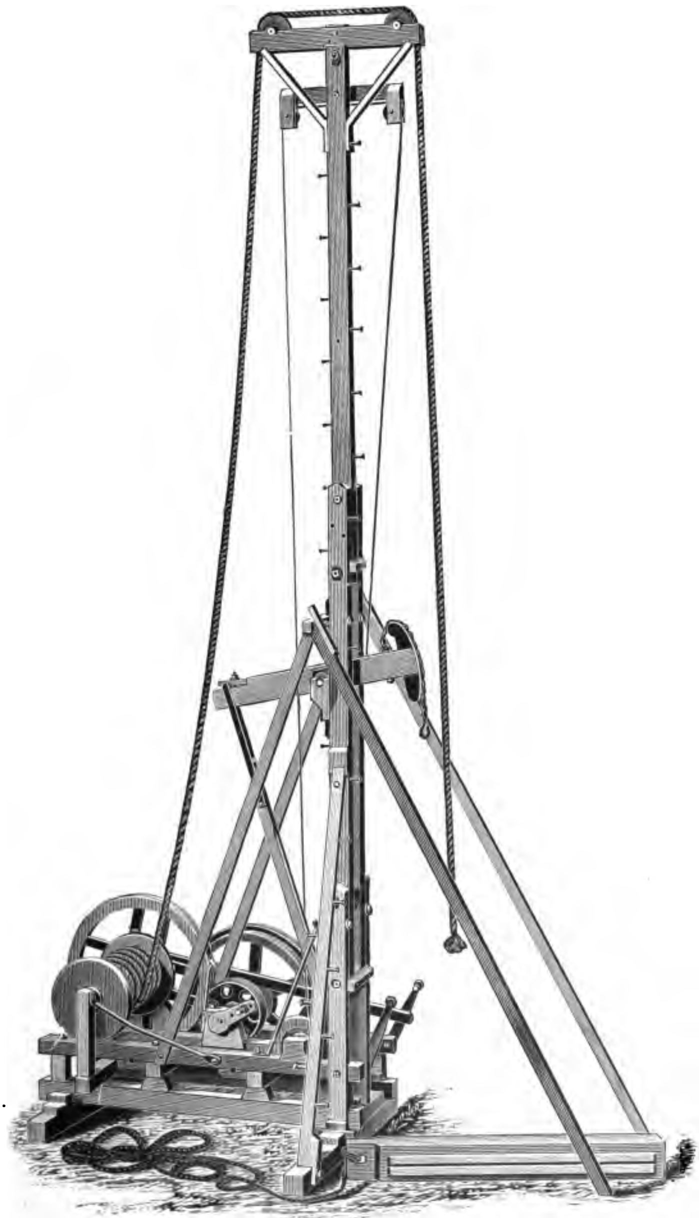
End View

Shipping weight, 24,000 pounds
Price, $550.00

CORBETT PORTABLE DRILLING RIG

SEGMENT WALKING BEAM, CHAIN AND CLEVIS, DOUBLE WHEELS FOR CABLE AND SAND LINE. FOR DRILLING 300 FEET

Fig. 1275

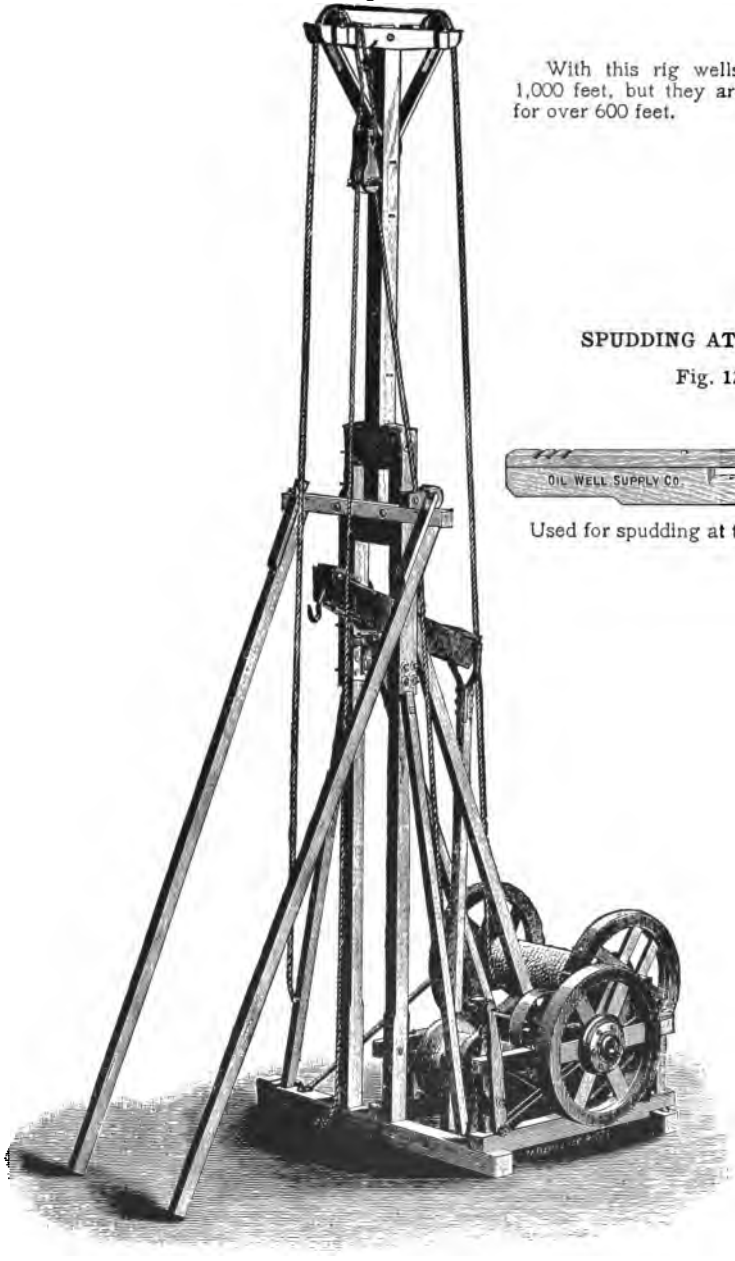


This and the portable rigs illustrated on pages 34 to 38 are adapted to drill wells from 300 to 1,000 feet, although deeper wells have been drilled with them. Power is applied to the band wheel by belt from an engine. The sand reel is operated by friction, applied by a lever; bull wheel by friction, or a chain and clutch. These rigs are simple, inexpensive, easily repaired, and strong. Price - $400 00

CORBETT PORTABLE DRILLING RIG

WITH COMMON WALKING BEAM

Fig. 1280



With this rig wells have been drilled 1,000 feet, but they are not recommended for over 600 feet.

SPUDDING ATTACHMENT

Fig. 1277

Used for spudding at the top of the well.

Complete rig, fig. 1280, without drive pipe attachment - - - - - - - - - - - $585 00
Complete rig, fig. 1280, with drive pipe attachment - - - - - - - - - - - - 620 00

CORBETT PORTABLE DRILLING RIG

GROUND PLAN

Showing arrangement of timbers, wheels, and parts

Fig. 1290

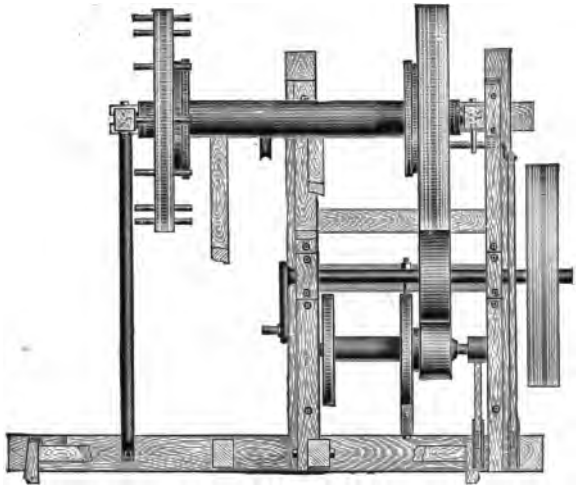
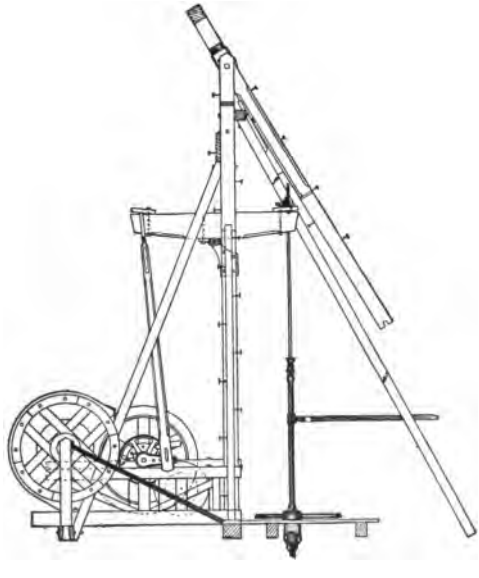


Fig. 1292



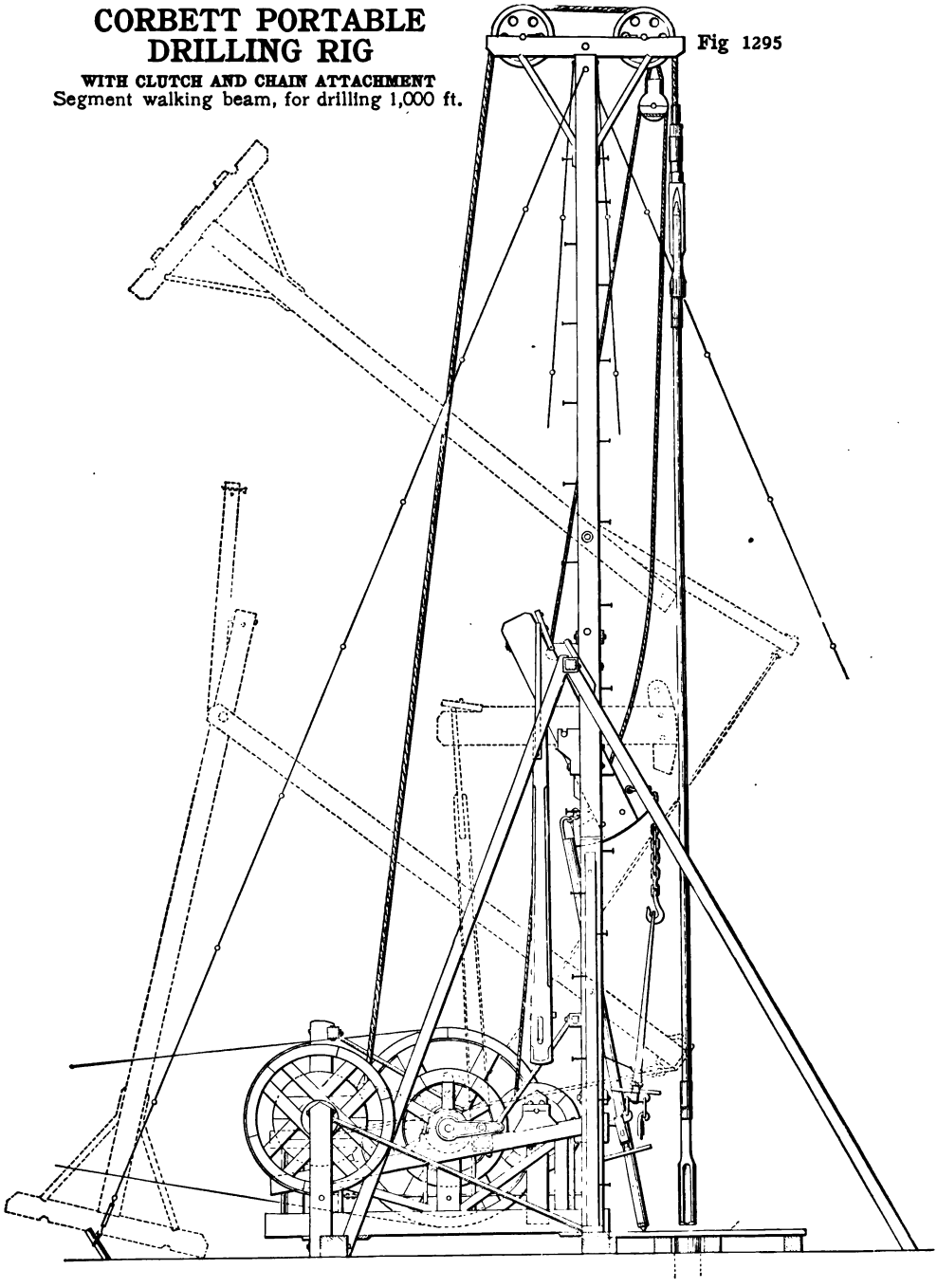
Arranged for pumping.

CORBETT PORTABLE DRILLING RIG

WITH CLUTCH AND CHAIN ATTACHMENT

Segment walking beam, for drilling 1,000 ft.

Fig 1295

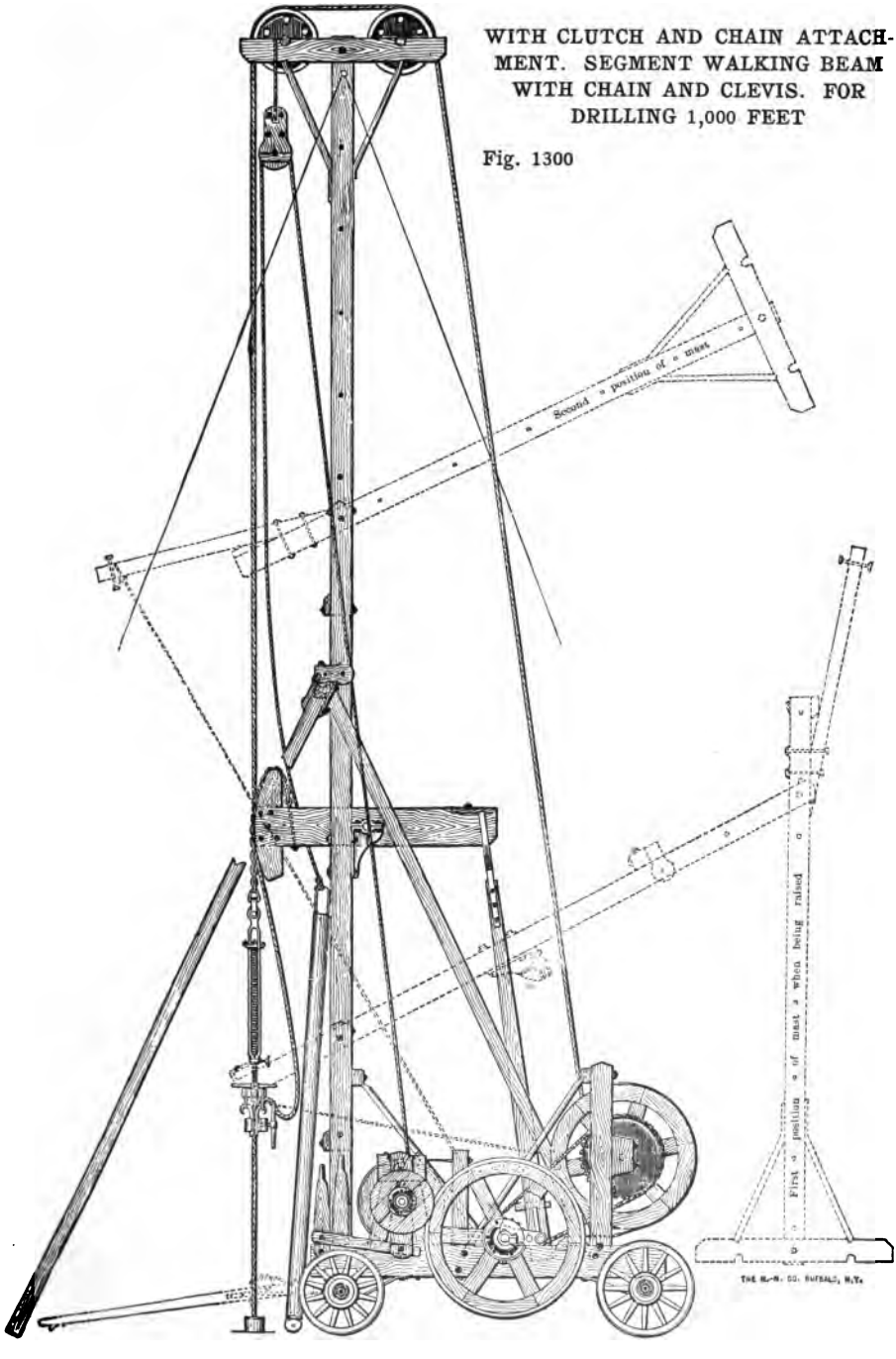


Price	$690 00
Drive pipe attachment (extra)	35 00

MOUNTED CORBETT PORTABLE DRILLING RIG

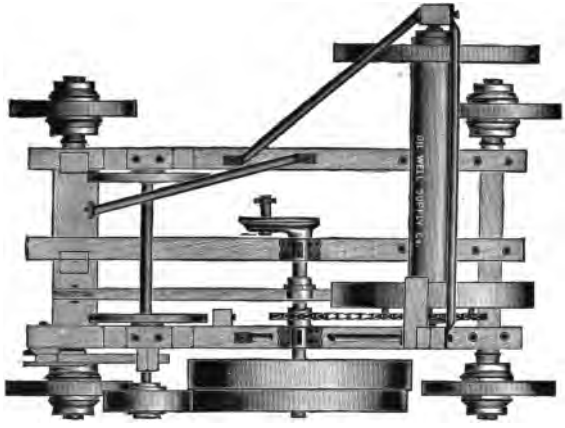
WITH CLUTCH AND CHAIN ATTACHMENT. SEGMENT WALKING BEAM WITH CHAIN AND CLEVIS. FOR DRILLING 1,000 FEET

Fig. 1300



GROUND PLAN OF MOUNTED CORBETT PORTABLE DRILLING RIG

Fig. 1301

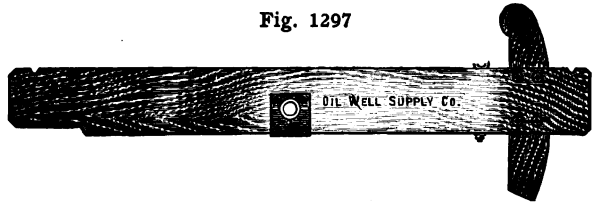


Mounted Portable Drilling Rig, Fig. 1300, page 37 - - - - - - - - - - - - - $800 00

This illustration, also those on pages 36 and 37, will show the substantial character of the Corbett Portable Drilling Rigs, mounted or unmounted. The parts are strong, well made, and if anything breaks it can be easily repaired. The sand-reels on all are operated by friction. In the larger rigs the bull wheels are operated by a chain attachment running from the main shaft, power being applied by a clutch. Friction power for operating bull wheels, for deep drilling, is not recommended. Mounted rigs are like the others, with the exception of the wheels. Before drilling, the wheels should be taken off, or something solid placed under the axles, so that the axles and wheels will not be subjected to the jar and strain of drilling. Any of the rigs shown can be furnished mounted, if desired.

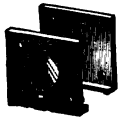
SEGMENT WALKING BEAM

Fig. 1297



SEGMENT WALKING BEAM CENTER IRONS

Fig. 1296



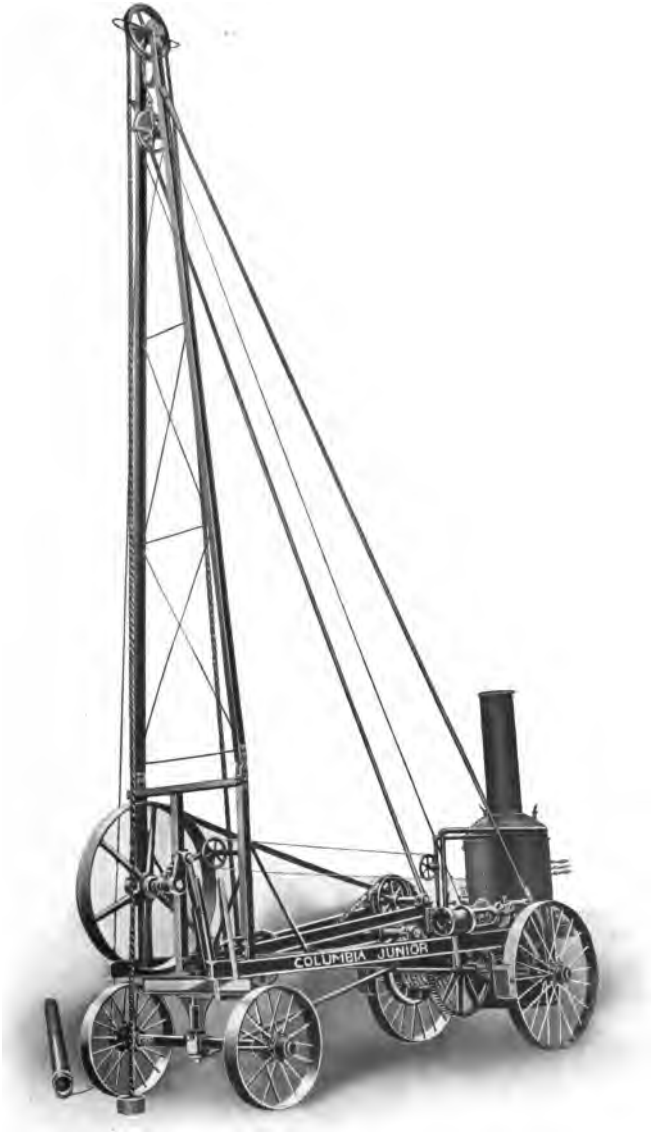
TOP VIEW OF SEGMENT WALKING BEAM

Fig. 1298

COLUMBIA PORTABLE DRILLING MACHINES

Are built of iron and steel, are practically indestructible, and are unaffected by climatic conditions. They are built in five sizes. The lightest, or No. 1, is a simple spudding machine. The others combine spudding arrangements and walking beam action They are furnished, when desired, with traction, and can be equipped with rotary devices, thus covering the entire field of drilling, from the shallow test or blast drill to the deepest oil and gas wells.

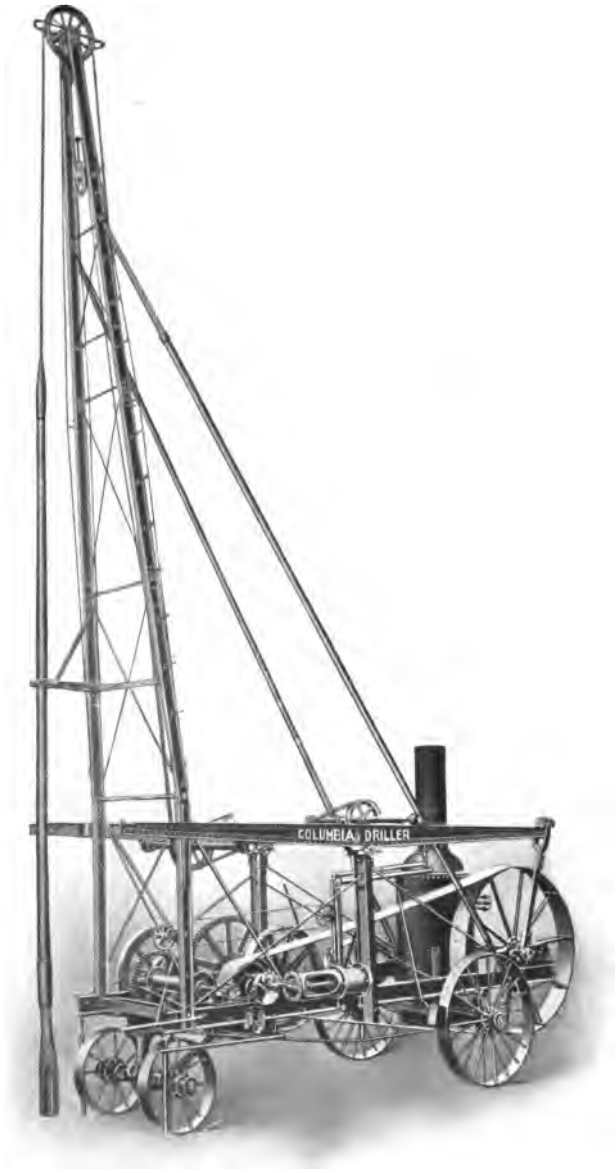
No. 1 OR COLUMBIA JUNIOR DRILLING MACHINE. Fig. 1309



For Water Wells, test bores or blast drills.

NO. 3 COLUMBIA DRILLING MACHINE

Fig. 1302



The No. 3 Drilling Machine is the smallest built with Walking Beam. With a capacity for drilling to a depth of 1000 feet, this machine is successfully used for cleaning out wells of considerable depth, and may also be used for handling sucker rods and tubing, as well as pumping.

THE NO. 3 TRACTION COLUMBIA DRILLING MACHINE

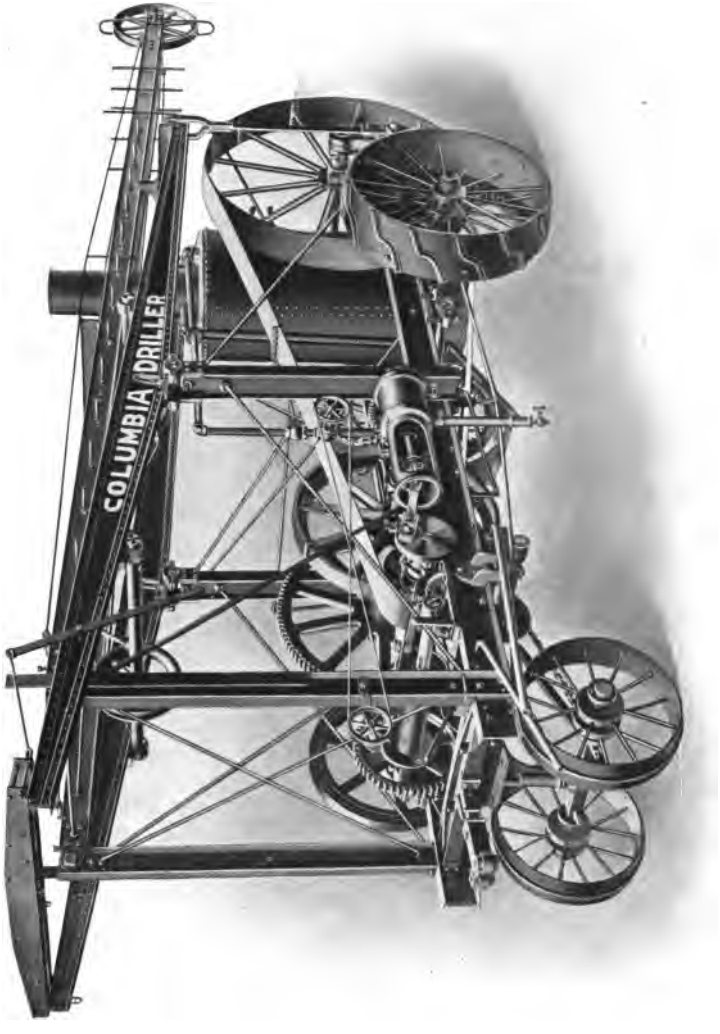


Fig. 1306

The No. 3 Traction Drilling Machine is built similarly to the No. 3 Portable, except that the mast is hinged. The traction arrangement whereby the machine is enabled to propel itself over rough country is under the complete control of the operator from one point. The same arrangement is followed on the No. 1 Traction machine.

NO. 5 COLUMBIA DRILLING MACHINE

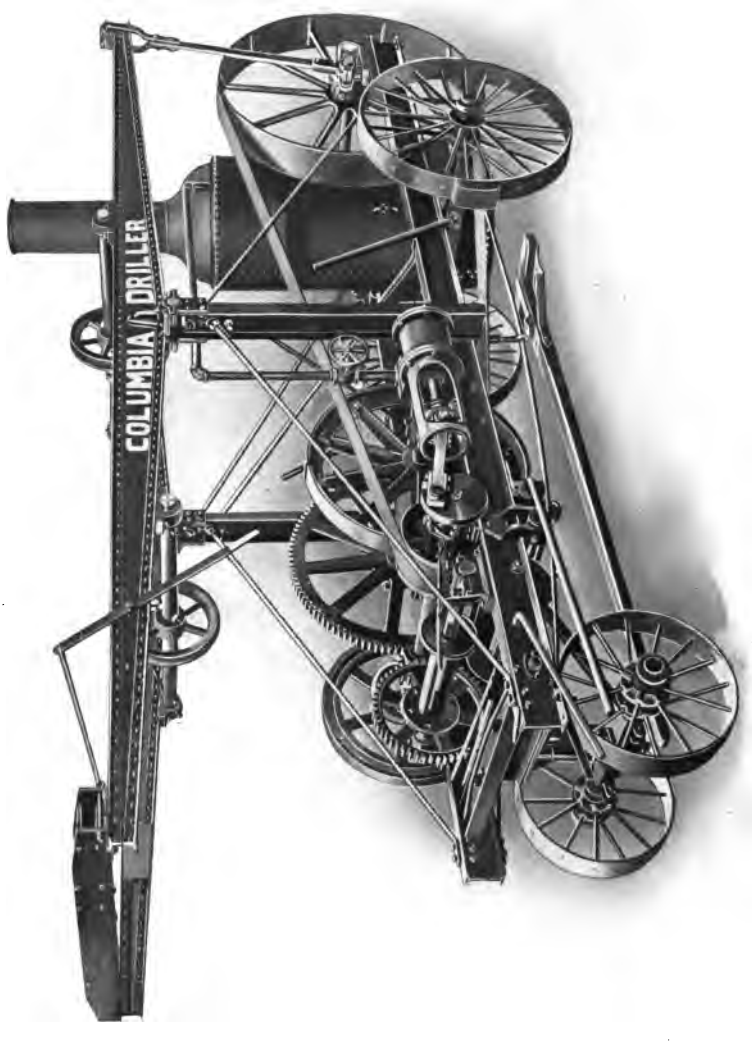


Fig. 1305

The No. 5 Drilling Machine is designed to meet a popular demand for a machine of moderate weight, but sufficient capacity for drilling oil and gas wells. It has a nominal capacity for drilling to a depth of 1000 feet and may be used to clean out wells to a depth of 3000 feet. This machine has a separate mast which rests on the ground and secured to the frame of the machine.

COLUMBIA DRILLING MACHINE, SPUDDING

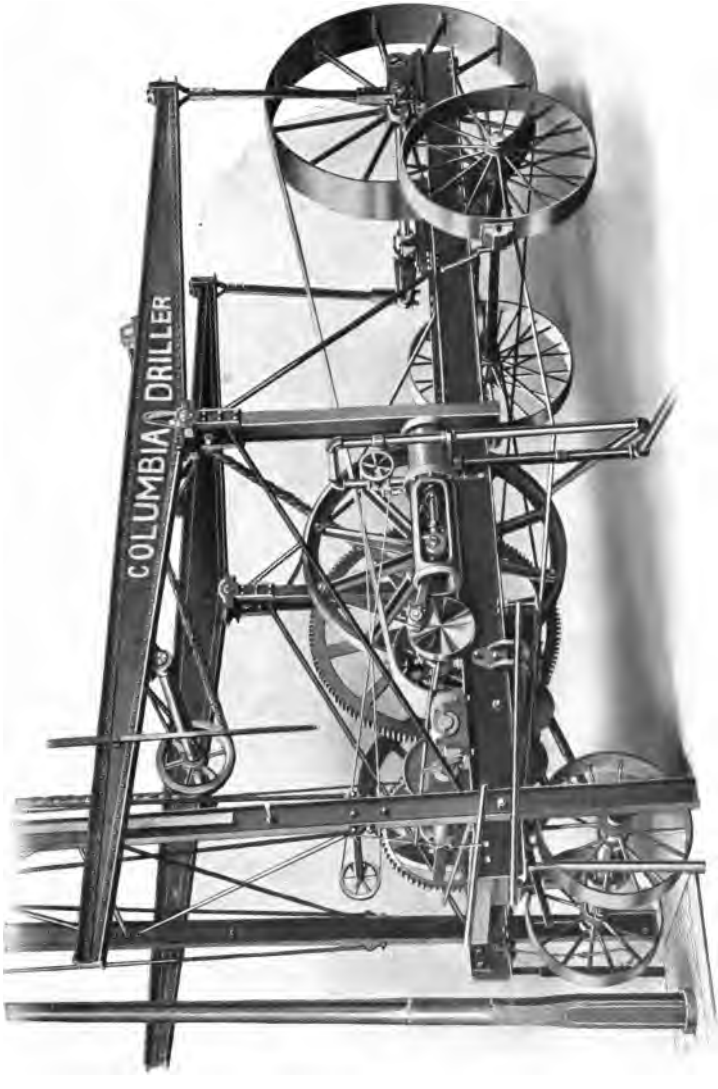
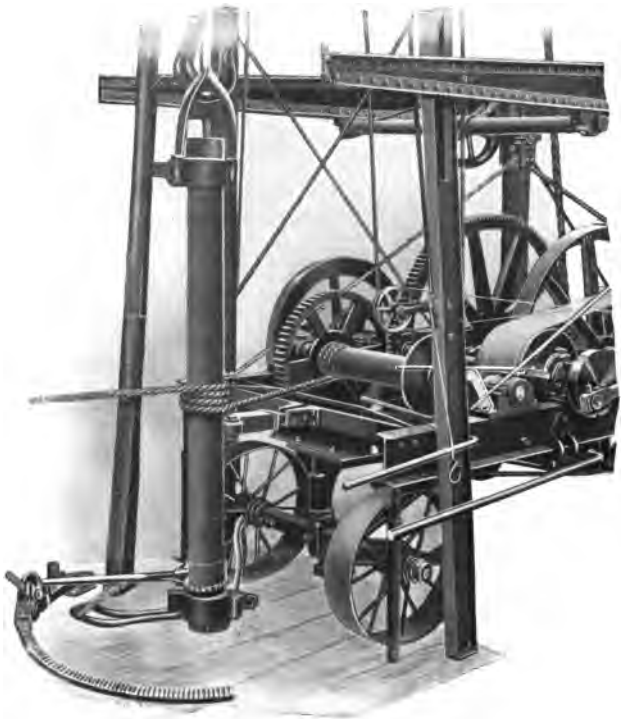


Fig. 1304

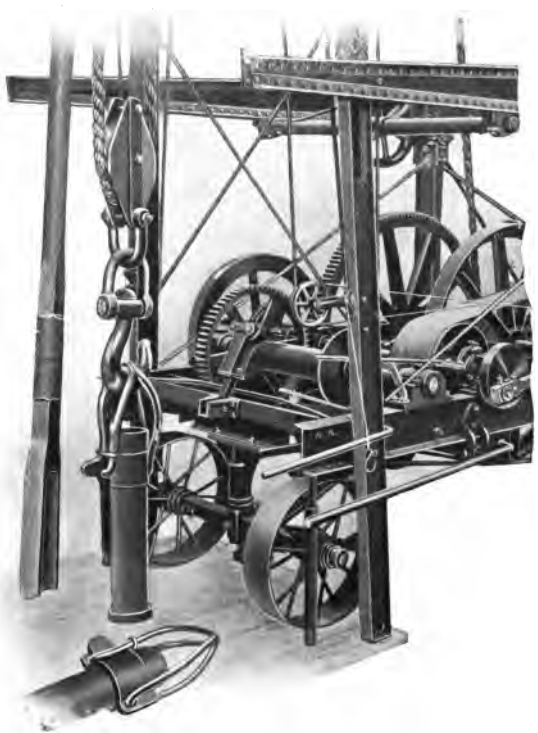
The No. 8 and No. 10 Drilling Machines are similar in general dimensions and differ merely in weight and capacity. In spudding with the Columbia Drilling Machines the motion is secured through the movement of the walking beam and it is not necessary to stop the engine or change the cables when it is required to withdraw the tools.

Fig. 1307



Columbia Drilling Machine Turning Casing.

Fig. 1308



Columbia Drilling Machine Lowering Casing.
Casing Turner Thrown Back.

DIMENSIONS, WEIGHTS AND PRICES OF COLUMBIA DRILLING MACHINES

	No. 1 Junior	No. 1 Traction	No. 3	No. 3 Traction	No. 5	No. 8	No. 10
Capacity, ft.	150	150	1000	1000	1000	1500	2500
Engine Cylinder, in.	5x6	5x6	8x8	8x8	9x9	9x12	10x12
Belt length, ft.	28½	28½	40	40	42	48	48
Belt width, in.	6	6	10	10	10	12	14
Height of mast, ft.	29	29	50	40	50	60	60
Band wheel diam., in.	48	48	72	72	80	90	90
Band wheel face, in.	6	6	10	10	10	12	14
Engine pulley diam., in.	10	10	14	14	16	20	20
Engine pulley, face, in.	6	6	10	10	10	12	14
Length walking beam, ft.	- - - -	- - - -	17 1/2	17 1/2	20 1/2	23¼	23¼
Length temper screw, ft.	- - - -	- - - -	5 7/12	5 7/12	5 7/12	6 1/2	6 1/2
Diameter of stem, in.	3¼	3¼	3½	4	4	4½	4½
Length of stem, ft.	14	14	30	20	30	34	40
H. P. of Boiler	5	5	15	15	18	20	20
Wagon wheels diam., in.	24x48	24x48	32x54	32x54	32x54	32x54	32x54
Wagon wheel tires, in.	5	5	6	6	8	8	8
Weight with boiler, lbs.	5300	6000	9000	10000	12000	- - - -	- - - -
Weight without boiler, lbs.	- - - -	- - - -	8000	- - - -	10700	12000	18000
Price with boiler	$860 00	1025 00	1280 00	1530 00	1535 00	- - - -	- - - -
Price without boiler	- - -	- - - -	1045 00	- - - -	1255 00	1555 00	2000 00

The rated capacity of the machines is merely an indication of the depth to which they will drill rapidly and economically when compared with the stationary wooden oil country rig.

Any of them will drill much deeper under favorable conditions.

The No. 5, No. 8 and No. 10 machines are not ordinarily equipped with boiler on frame.

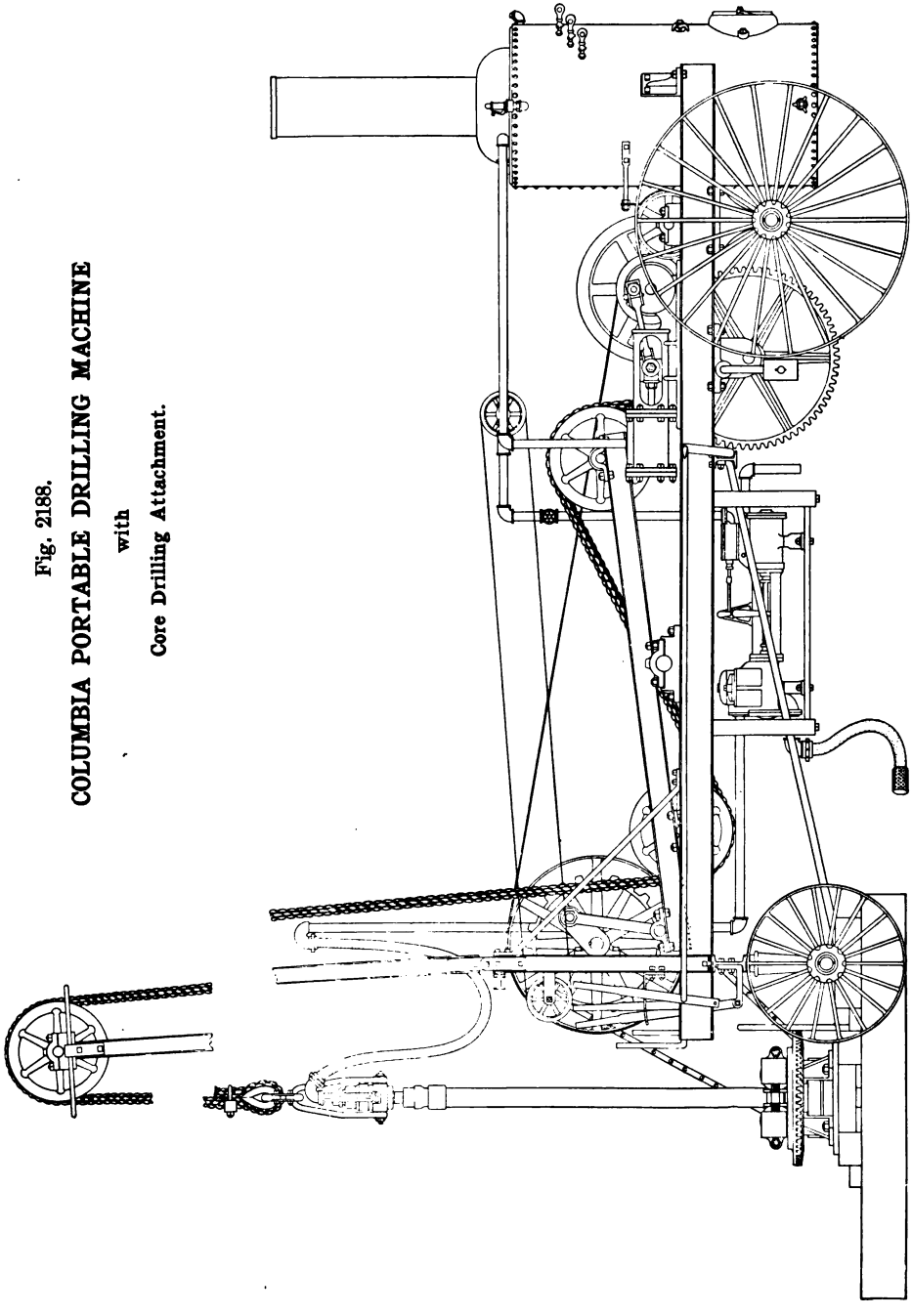
The regular oil country boiler may be used advantageously.

Fig. 2188.

COLUMBIA PORTABLE DRILLING MACHINE

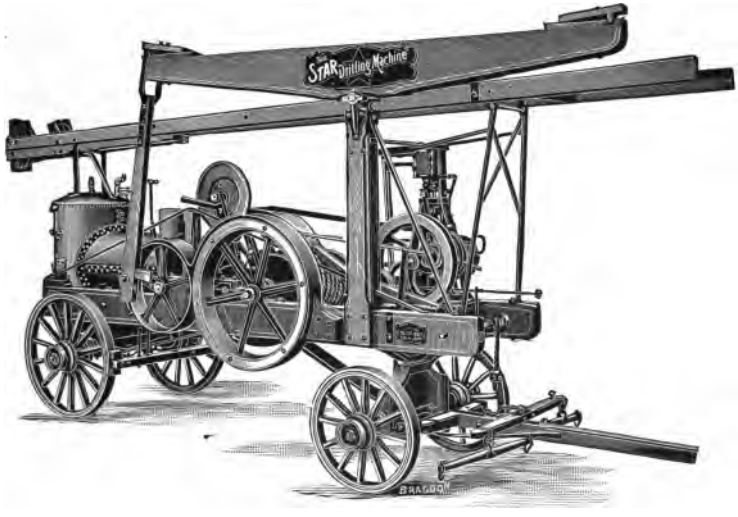
with

Core Drilling Attachment.



THE STAR DRILLING MACHINE

Fig. 1315



PRICES OF MACHINES WITHOUT ROPES AND TOOLS

No. 15	$540 00
No. 16	650 00
No. 17	550 00
No. 18	715 00
No. 19	790 00
No. 20	875 00
No. 21	960 00
No. 22	1050 00
No. 23	1160 00
No. 24	1270 00
No. 25	1380 00
No. 26	1600 00
No. 27	1740 00
No. 28	1830 00

OUTFITS FOR SINKING WELLS OF LARGE DIAMETER THROUGH SOFT FORMATIONS AND GLACIAL DRIFTS

As shown in the preceding pages, the Cable System, used throughout the principal petroleum fields of America, is the best for hard formations; the Hydraulic Rotary System for formations composed of soft sedimentary deposits, or beds of sand; the Combination System for localities where both conditions are found, but glacial drift, where boulders, or heavy gravel beds are encountered, can best be overcome by a special method known as the "Stovepipe and Mud Scow" system.

This has been brought to a high degree of practicability. It is particularly adapted for sinking water wells where the chief desideratum is a large supply, obtainable only from a well with large diameter.

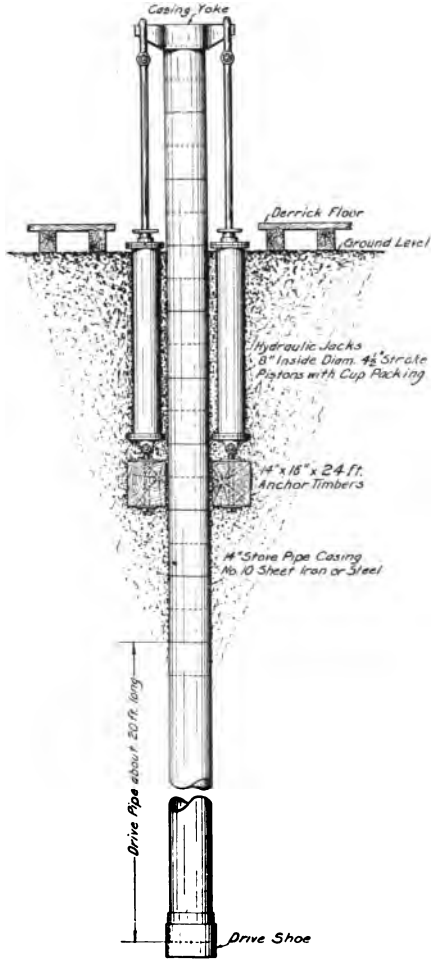
THE DISTINCTIVE FEATURES ARE

A portable ladder derrick, ranging in height from 34 to 36 feet, mounted on heavy trucks. The "Mud Scow," a tool combining the properties of a cutting bit and sand pump. The "Stovepipe" Casing, or riveted pipe.

Hydraulic Jacks anchored to heavy timbers and used in forcing down the casing. The "Perforator" for making perforations at any desired point in the pipe after it is placed in the well.

The inside diameter of the stovepipe casing (see Figs. 1318 and 1319) as usually used in lining wells for the purpose mentioned is 10, 12 and 14 inches, and occasionally 16 inches. It is made of sheet iron or steel from No. 14 to No. 10 U. S. guage. The sheets are of sufficient size to roll into joints of casing of the required diameter and to finish 24 inches long. Each joint has a longitudinal-riveted seam, and after being riveted the ends are faced off by "turning," to make the joint true and exactly 24 inches long. A string of stovepipe casing is built up as indicated in Figs. 1318 and 1319, from a drive shoe and pipe with a double string of joints, one inside the other, thus making a flush joint casing practically smooth both inside and out.

Fig. 1318



OUTFITS FOR SINKING WELLS OF LARGE DIAMETER THROUGH SOFT FORMATIONS AND GLACIAL DRIFTS

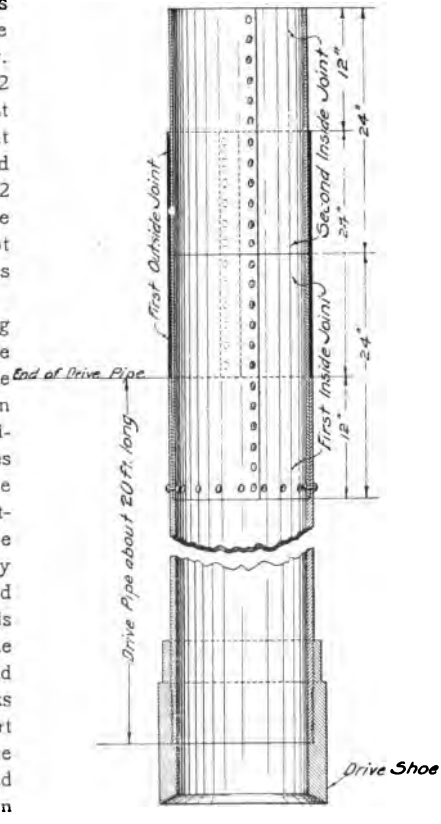
THE DISTINCTIVE FEATURES—Continued

The drive shoe is a steel forging, finished to dimensions by turning, and formed with an annular cutting edge, somewhat larger in diameter than the outside of the casing. It is also recessed and sometimes threaded so the drive pipe may be shrunk on or screwed into it, to a butt joint. The stovepipe casing may be started from a properly recessed drive shoe, but it is easier to start a well straight and to keep it perfectly plumb by putting the drive shoe on a 20 foot length of drive pipe to act as a guide to the joints of stovepipe casing; the drive pipe should be heavy lap-welded pipe or casing, its outside diameter being fully equal to that of the outside joints of stovepipe casing to follow. This 20 foot drive pipe has to be recessed 12 inches at the top (see Fig. 1319) to take the first inside joint of stovepipe casing, which joint butts on the bottom of the 12-inch recess and is riveted to the drive pipe and extends 12 inches beyond it. Placing next the first outside joint of casing, it butts on the end of the 20-foot drive pipe and covers and extends 12 inches above the first inside joint.

Next will be the second inside joint butting on the first and extending 12 inches above the first outside joint. Next will be an outside joint butting on an outside joint, followed by an inside joint butting on an inside joint, each additional joint making the casing string 12 inches longer and so on to any length desired. The only fastening done between the joints is denting with a common pick. Joints of stovepipe casing do not fit together so as to be perfectly water tight, and it is not necessary they should for water well work. A string of casing is built up and forced into a well for lining the same as fast as drilling progresses by two and sometimes four hydraulic jacks. These jacks are placed upright at suitable distance apart and bolted to anchor timbers buried to the proper depth; also, the jacks are so arranged that they can be quickly linked to the lugs on the casing yoke for a down pull on the casing; all as indicated in Fig. 1318.

Fig. 1319

Sectional Plan.



OUTFITS FOR SINKING WELLS OF LARGE DIAMETER THROUGH SOFT FORMATIONS AND GLACIAL DRIFTS

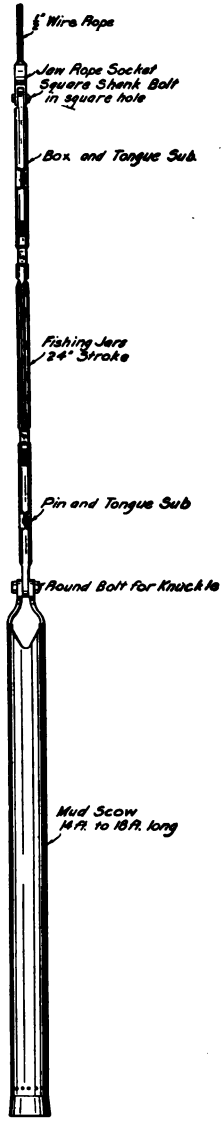
THE DISTINCTIVE FEATURES—Concluded

The mud scow is a combined drilling tool and sand pump, shown in fig. 1321, with the whole string of tools as commonly used in drilling wells of the class mentioned. This string consists of a jaw rope socket followed by a tongue and box sub, followed by the jars, followed by a pin and tongue sub, followed by the mud scow. The latter tool has the body of a common sand pump or bailer, and is made of a suitable piece of pipe; its bail is formed by two heavy ears by which it is connected to the tongue of the sub by a bolt, thus forming a knuckle joint used in dumping; it has a bottom similar to a California sand pump bottom. This bottom is a steel forging turned to dimensions with an annular cutting edge slightly larger in diameter than the body of the mud scow and fitted with a flat valve opening inwardly, This bottom is sometimes modified for drilling in clay or gumbo by a bit being forged across it and extending six inches or eight inches beyond the annular cutting edge.

The jars commonly used for work of this kind are the ordinary oil well fishing jars of 24-inch stroke, outside diameter 5¼ inches, box diameter 4⅛ inches, pin and box 2 inches by 3 inches—7 flat thread; the diameter of the other parts of the string of tools to correspond.

Further Information on Application.

Fig. 1321

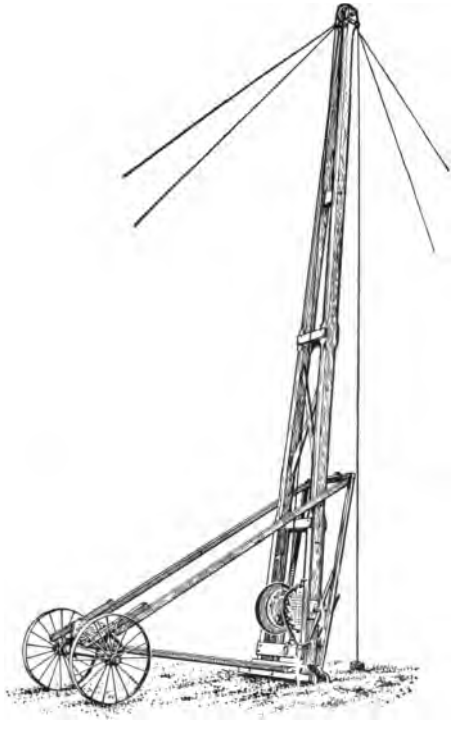


PORTABLE DERRICK

FOR PULLING RODS, TUBING OR CASING

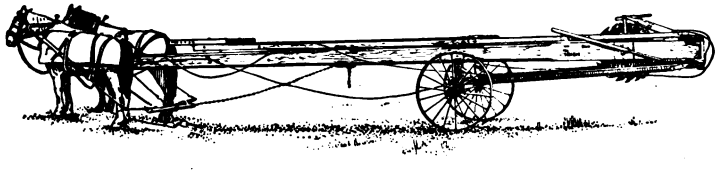
THE IRISH PULLING MACHINE

Fig. 1340



The Irish Pulling Machine is designed for pulling casing, tubing and sucker rods from oil and gas wells or for lowering same. The mast is made of solid timbers and has ample strength to do any work that may be ordinarily required. It can be raised to working position or lowered ready for transportation either by hand or horse power. The rods can be pulled by hand power. One team of horses can pull tubing from wells of 1200 ft. depth.

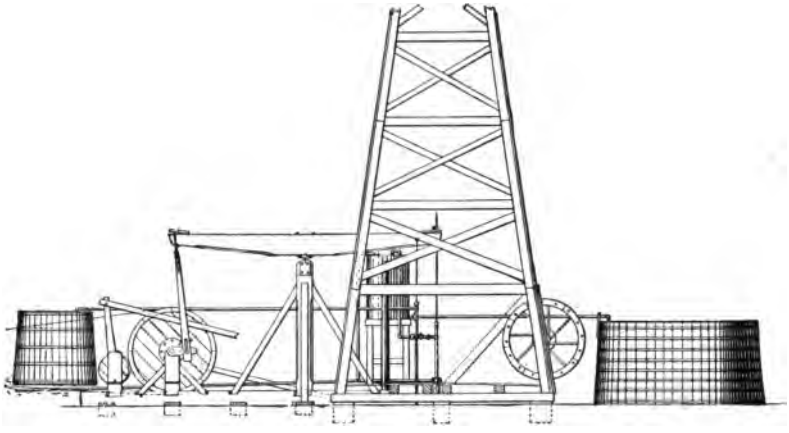
Fig. 1341



Height of Mast, 38 ft. Weight, 1900 lbs. Price, $300.00

PUMPING WELL

Fig. 1268

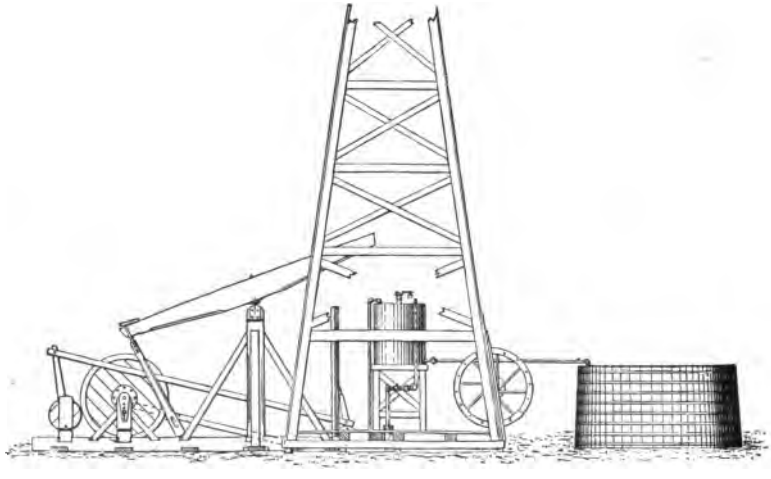


Water Tank Gas Tank Oil Tank

In this illustration a water well is shown as drilled a few feet from the oil well, on a line with the Samson post. The pumping rods of each well are attached to the walking beam and they are operated with the same stroke. The oil is pumped into the gas tank and is there separated by its own gravity from the gas. By means of a pipe connected to the bottom of the gas tank, the oil is conducted to the oil tank. The gas pipe extends from the upper part of the gas tank and conducts the gas to the boiler, where it is burned. Water is pumped direct from the water well to the water tank for use in the boiler.

FLOWING WELL

Fig. 1270



The oil flows into the gas tank and is separated by its own gravity from the gas, and is then conducted to the large tank on the right. The gas is led by a pipe from the top of the gas tank and is used for either fuel or light. A gas tank is essential to separate the oil from the gas.

IDEAL SECTIONS OF PUMPING AND FLOWING WELLS

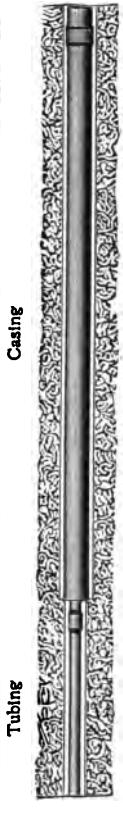
PUMPING WELL **FLOWING WELL**

Casing Head, Gas Pipes, Derrick Floor, Derrick Sills, Drive Pipe, Casing

Fig. 1350

Casing and Tubing

Fig. 1351



Tubing and Sucker Rods

Fig. 1352

Working Valves, Sucker Rods, Tubing, and Perforated Pipe

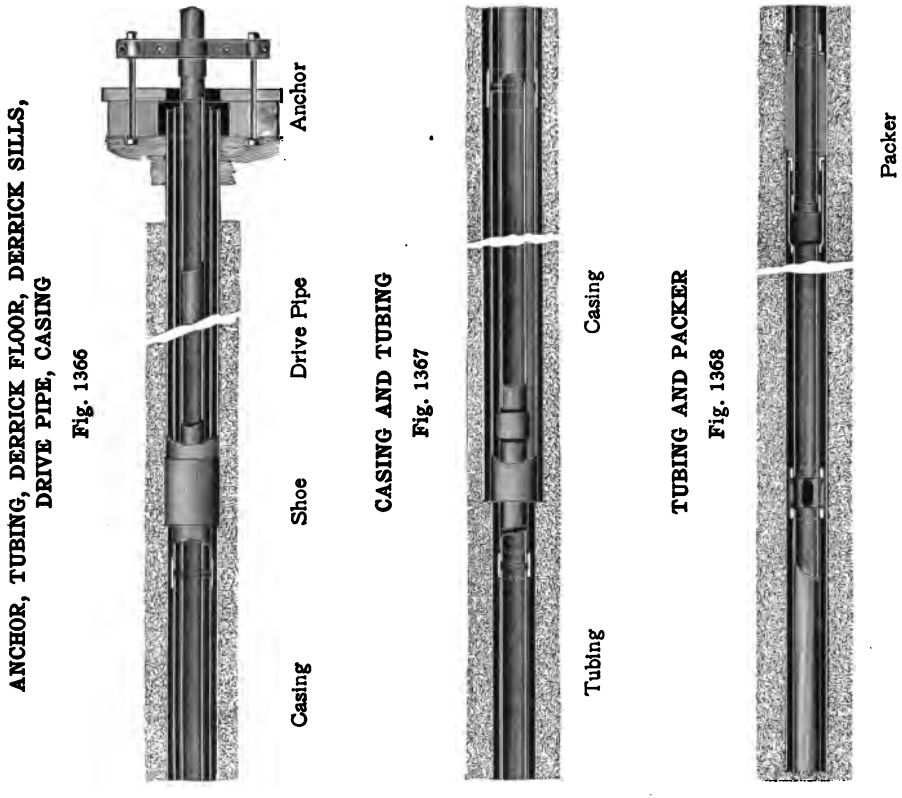
Fig. 1353

Tubing, Packer, and Perforated Pipe

Fig. 1362

Fig. 1350 represents the simplest form of well construction, the drive pipe extending from the surface of the derrick floor to the solid rock, passing through the alluvial deposits and preventing all loose earth from falling in the well and clogging the tools. This is followed by the insertion of the "casing," passing through the drive pipe and extending to a sufficient depth to shut off all water from the oil-bearing rock below. In many formations it is necessary to use several "strings" of casing to shut off various caves or soft places in the wall of the well, each "string" being of a size permitting its easy passage through the preceding "string."

IDEAL SECTIONS OF GAS WELL



ANCHOR, TUBING, DERRICK FLOOR, DERRICK SILLS, DRIVE PIPE, CASING
Fig. 1366

CASING AND TUBING
Fig. 1367

TUBING AND PACKER
Fig. 1368

DETAILED PARTS OF STANDARD RIG—RIG IRONS

RIM FOR CALF WHEEL
Fig. 2277

OUTER TUG WHEEL
Fig. 2278

Attached to band wheel shaft for turning calf wheel.

For prices see page 56.

DETAILED PARTS OF STANDARD RIG—RIG IRONS

SHAFT, CRANK, AND FLANGES, COMPLETE
Fig. 2232

CENTER IRONS
Fig. 2236

ROUND IRON STIRRUP
Fig. 2235

BUSHED SHEAVE
Fig. 2204

For rotary rig

For price see page 25

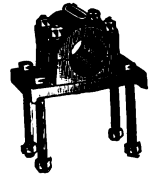
DERRICK AND SPUDDING PULLEY
Fig. 2242

SAND PUMP PULLEY
Fig. 2244

SAND PUMP PULLEY
Fig. 2240

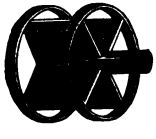
For wire line

JACK POST BOX
Fig. 2256

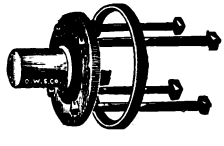


GUDGEONS

WING
Fig. 2250



BOWL
Fig. 2254

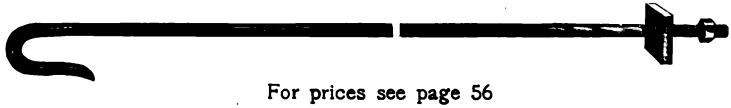


OUTER JACK POST BEARING
Fig. 2257

JACK POST STIRRUP
Fig. 2279

JACK POST EYE BOLT, Fig. 2280

JACK POST HOOK BOLT, Fig. 2281



For prices see page 56

RIG IRON PARTS

Size - - - - - - - - - - - - inches	3½	Wgt. lbs.	4	Wgt. lbs.	4½	Wgt. lbs.	5	Wgt. lbs.
Rig iron shaft, fig. 2232, complete	$41 50	541	$61 00	850	$70 50	943	$84 00	1089
Shaft only, regular	15 50	165	20 50	220	23 75	275	33 00	365
Shaft only, 6 ft. 6 in., for California rig	- - -	- - -	- - -	- - -	28 00	310	39 00	390
Collar and set screw	85	7	1 00	8	1 15	11	1 25	15
Crank only	8 25	140	14 50	238	15 50	240	17 50	250
Wrist pin and nut	4 00	19	6 50	31	6 50	31	6 50	35
Wrist pin nut only	85	- - -	1 00	- - -	1 15	- - -	1 15	- - -
Wrist pin washer	25	- - -	30	- - -	35	- - -	40	- - -
Pair flanges, complete	13 00	210	20 50	353	23 75	386	26 00	422
Flanges only, per pair	12 00	198	19 50	336	22 75	369	25 00	405
Flange keys, each	40	3	40	4	65	4	1 00	4
Bolts for flanges, per set (8)	1 00	9	1 00	13	1 00	13	1 00	13
Stirrup, fig. 2235, complete	5 50	67	7 50	90	7 50	90	7 50	90
Stirrup, round iron, fig. 2235, complete, Mannington Pattern	- - -	- - -	8 00	110	8 00	110	8 00	110
Stirrup, Mannington Pattern, 2½ in. Rd. iron	- - -	- - -	- - -	- - -	13 00	140	13 00	140
Bolts for stirrup, per set (3)	20	4	25	4	25	4	25	4
Set center irons, fig. 2236, complete	15 00	279	18 00	368	18 00	368	18 00	368
Saddle only	7 50	130	8 50	170	8 50	170	8 50	170
Saddle bolts, per set (4)	1 00	15	1 00	15	1 00	15	1 00	15
Side irons, per pair	5 50	94	7 50	136	7 50	136	7 50	136
Side iron bolts, per set (4)	1 00	10	1 00	10	1 00	10	1 00	10
Side iron cap	1 15	14	1 50	18	1 50	18	1 50	18
Side iron cap bolts, per set (2)	10	2	10	2	10	2	10	2
Set bowl gudgeons, fig. 2254, complete	- - -	- - -	12 50	200	12 50	200	12 50	200
Bowl gudgeons only, per pair	- - -	- - -	9 00	144	9 00	144	9 00	144
Bowl gudgeon bands, per pair (2)	- - -	- - -	1 75	20	1 75	20	1 75	20
Bowl gudgeon bolts, per set (8)	- - -	- - -	1 75	36	1 75	36	1 75	36
Set wing gudgeons, fig. 2250, complete	7 75	140	9 00	- - -	- - -	- - -	- - -	- -
Wing gudgeons only, per pair	4 75	111	6 00	- - -	- - -	- - -	- - -	- - -
Wing gudgeon bands, per set (4)	3 00	29	3 00	29	- - -	- - -	- - -	- - -
Sand pump pulley, fig. 2244, 13 inch	3 60	41	- - -	- - -	- - -	- - -	- - -	- - -
Sand pump pulley, fig. 2244, 14 inch	4 50	48	4 50	48	- - -	- - -	- - -	- - -
Sand pump pulley for wire line, fig. 2240, 24 inch	- - -	- - -	7 25	90	7 25	90	7 25	90
Derrick pulley, fig. 2242, 18 inch	4 75	75	- - -	- - -	- - -	- - -	- - -	- - -
Derrick pulley, fig. 2242, 22 inch	7 00	110	7 00	110	- - -	- - -	- - -	- - -
Derrick pulley, fig. 2242, 30 inch	14 50	280	14 50	280	14 50	280	14 50	280
Spudding pulley, fig. 2242, 36 inch	16 00	360	16 00	360	16 00	360	16 00	360
Jack post box, fig. 2256, complete	6 00	77	7 00	94	7 75	104	9 00	116
Jack post box, bottom part only	4 00	65	4 65	82	5 25	92	6 00	104
Jack post box, bolts for bottom part (4)	75	- - -	75	- - -	75	- - -	75	- - -
Jack post box, top part or cap only	2 00	- - -	2 35	- - -	2 50	- - -	3 00	- - -
Jack post box, bolts for cap, per set (4)	50	- - -	50	- - -	50	- - -	50	- - -
Outer Jack Post Bearing, Fig. 2257	- - -	- - -	4 50	58	6 50	65	9 00	75
Rim for calf wheel, 90 in. dia. fig. 2277	- - -	- - -	- - -	- - -	25 00	440	- - -	- - -
Rim bolts, per set (8)	- - -	- - -	- - -	- - -	1 00	13	- - -	- - -
Outer tug wheel, fig. 2278, 48 inches dia.	- - -	- - -	- - -	- - -	35 00	487	- - -	- - -
Key for outer tug wheel	- - -	- - -	- - -	- - -	1 75	3	- - -	- - -
1¼ in. x 8 ft. Jack post eye bolts, fig. 2280, per set (2)	- - -	- - -	- - -	- - -	9 00	67	9 00	67
¾ in. x 8 ft. Jack post hook rods, fig. 2281, per set (2)	- - -	- - -	- - -	- - -	5 75	30	5 75	30
¾ x 16 inch Jack post eye bolts, per set (2)	- - -	- - -	- - -	- - -	2 50	8	2 50	8
1 x 24 inch Jack post D. E. bolts, per set (2)	- - -	- - -	- - -	- - -	2 00	11	2 00	11
¾ in. x 7½ ft. Jack post draw bolts, per set, (2)	- - -	- - -	- - -	- - -	5 75	30	5 75	30
Jack Post Stirrup, Fig. 2279	- - -	- - -	- - -	- - -	9 00	38	9 00	38

DETAILED PARTS OF STANDARD RIG

Fig. 2252

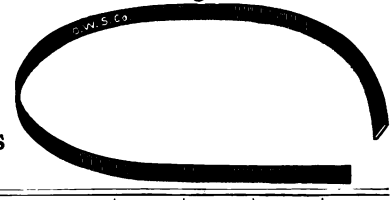
HEAVY SAND PULLEY

Wood incased. For $\frac{3}{8}$ and $\frac{1}{2}$ inch Wire Rope. Self-lubricating.

With 24-inch diameter sheave - - - - - - $16 00

Weight, 162 pounds.

Fig. 2263



BRAKE IRONS

BRAKE BAND

Width and thickness - - - - - - - - inches	¼ x 5	¼ x 5	¼ x 6	¼ x 7	¼ x 7	¼ x 9
Length - - - - - - - - - - - - - feet	26	28	28	26	28	28
Weight - - - - - - - - - - - - - **lbs.**	**105**	**115**	**142**	**152**	**175**	**213**
Price - - - - - - - - - - - - - - -	$5 00	5 50	6 50	7 00	8 00	9 75

BRAKE LEVER AND STAPLE

Fig. 2265

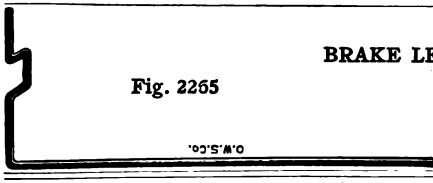


Fig. 2269

Levers, diameter - - - inches	1½	1½	1¾	1¾	1¾	1¾	1¾	2
Length - - - - - - - - feet	9	10	9	9	12	9	12	12
Size of band for - - - inches	5	5	6	7	7	9	9	9
Price - - - - - - - - - - -	$3 25	3 50	3 75	4 00	4 50	4 25	4 75	7 00
Weight - - - - - - - - **lbs.**	**60**	**65**	**75**	**75**	**98**	**75**	**98**	**128**
Brake staples - - - - - - each	$0 40	40	45	50	50	60	60	- - -
Weight - - - - - - - - **lbs.**	**3**	**3**	**4.5**	**6**	**6**	**8**	**8**	**8**

BACK BRAKE

Fig. 2267

Width - - - - - - - - - inches	8	10	10
Thickness - - - - - - - - inches	1/16	3/32	3/32
Length - - - - - - - - - feet	8	8	10
Weight - - - - - - - - - **lbs.**	**22**	**45**	**55**
Price - - - - - - - - - - -	$1 25	2 50	3 15

DRILLING HOOK

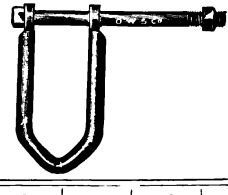
Fig. 2238

Price - - - - - - - $3 50

Weight, 35 pounds.

THREE-POLE DERRICK CLEVIS

Fig. 1253

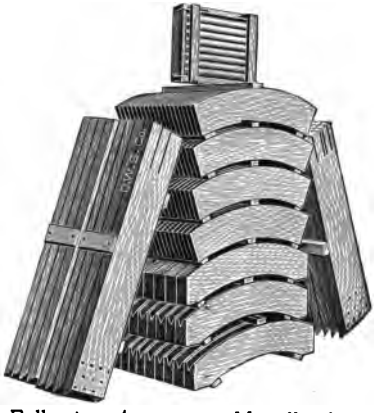


Diameter iron, inches	1	1⅛	1¼	1⅜	1½
Weight - - - **lbs.**	**20**	**23**	**26**	**34**	**38**
Price - - - - - - -	$2 90	3 35	3 50	4 10	5 00

WOOD WORK FOR RIG IRON OUTFITS

Cants or segments used in building the wheels and arms and handles of bull wheels. Cants, arms and handles are crated for shipment and convenience in handling, and vary in size and number to conform with the requirements of the various outfits as shown herewith.

Fig. 2291



Full set cants, arms and handles for bull wheels

Fig. 2297

Full set cants for band and tug wheel

SPECIFICATIONS

FOR 3½ INCH REGULAR OUTFIT

		Weight lbs.	Each	Per set
BAND WHEEL, 9 feet diameter, 8-inch face.	40 1-inch pine cants	124	$0 13	$5 20
TUG PULLEY on band wheel 6½ feet diameter.	8 2-inch grooved hemlock cants	55	$0 20	
	8 2-inch plain hemlock cants	55	20	
	16 1-inch pine cants	50	13	$5 28
		160		
BULL WHEEL 7½ feet diameter.	For Tug Side.			
	8 2½-inch grooved hemlock cants	85	$0 32	
	32 1 inch pine cants	98	17	
	8 8 inch oak arms	165	36	
	16 half handles	10	02½	
	For Brake Side.			
	8 2½-inch plain hemlock cants	85	$0 30	
	40 1-inch pine cants	122	17	
	8 8-inch oak arms	165	36	
	16 half handles	10	02½	$23 76
		740		

Band wheel, tug pulley. and bull wheel cants, arms and handles, complete as above - $34 24

WOOD WORK FOR RIG IRON OUTFITS

SPECIFICATIONS

FOR OHIO AND INDIANA OIL FIELDS

		Weight lbs.	Each	Per Set
BAND WHEEL, 9 feet diameter, 8 inch face.	40 1-inch pine cants	125	$0 13	$5 20
TUG PULLEY on band wheel, 6½ feet diameter.	16 1x8-inch pine cants	50	13	
	8 2x8-inch grooved hemlock cants	55	20	
	8 2x8-inch plain hemlock cants	55	20	5 28
		160		
BULL WHEEL, 7½ feet diameter	For Tug Side.			
	16 1¼x5-inch pine cants	68	18	
	8 2 x5-inch grooved hemlock cants	55	20	
	8 8-inch oak arms, tapered and bored	165	40	
	16 half handles	10	02½	
	For Brake Side.			
	24 1x5-inch pine cants	75	13	
	8 2x5-inch plain hemlock cants	55	20	
	8 8-inch oak arms, tapered and bored	165	40	
	16 half handles	10	02½	16 40
		603		
Complete set cants, arms and handles, as above				$26 88

FOR 4 AND 4½-INCH REGULAR OUTFIT

		Weight lbs.	Each	Per Set
BAND WHEEL, 10 feet diameter, 10-inch face.	40 1-inch pine cants	170	$0 19	$7 60
TUG PULLEY on band wheel, 7 feet diameter.	8 2½ inch grooved hemlock cants	65	26	
	8 2½-inch plain hemlock cants	82	24	
	16 1 -inch pine cants	45	15	6 40
		192		
BULL WHEELS, 7½ feet diameter.	For Tug Side.			
	8 2½-inch grooved hemlock cants	85	32	
	32 1 -inch pine cants	98	17	
	8 8 -inch oak arms, straight	165	36	
	16 half handles	10	02½	
	For Brake Side.			
	8 2½-inch plain hemlock cants	97	30	
	40 1 -inch pine cants	116	17	
	8 8 -inch oak arms, straight	165	36	
	16 half handles	10	02½	23 76
		746		
Band wheel, tug pulley and bull wheel cants, arms and handles, complete, as above,				$37 76

FOR 4½-INCH REGULAR OUTFIT WITH DOUBLE TUG AND 7-INCH BRAKE IRONS

		Weight lbs	Each	Per Set
BAND WHEEL, 10 feet diameter, 10 or 12 inch face.	40 1-inch pine cants	170	$0 19	$7 60
TUG PULLEY on band wheel, 7 feet diameter.	16 2½-inch grooved hemlock cants	137	26	
	8 2½-inch plain hemlock cants	82	24	
	24 1 -inch pine cants	75	15	9 68
		294		

WOOD WORK FOR RIG IRON OUTFITS

SPECIFICATIONS

FOR 4½-INCH REGULAR OUTFIT WITH DOUBLE TUG AND 7-INCH BRAKE IRONS CONTINUED

		Weight, lbs.	Each	Per Set
BULL WHEELS, 7½ feet diameter.	For Tug Side.			
	16 2½ inch grooved hemlock cants -	170	$0 32	
	40 1 -inch pine cants - - - - - -	116	17	
	8 10 -inch oak arms - - - - - -	185	42	
	16 half handles - - - - - - - -	10	02½	
	For Brake Side.			
	8 2½-inch plain hemlock cants - -	97	30	
	40 1 -inch pine cants - - - - - -	116	17	
	8 8 -inch oak arms - - - - - -	165	36	
	16 half handles - - - - - - - -	10	02½	$28 16
		869		

Band wheel, tug pulley and bull wheel cants, arms and handles, complete as above - $45 44

NOTE—Where 9 inch brake irons are used, substitute 8 10-inch oak arms instead of 8-inch, on brake side of bull wheel, and add 16 1-inch pine cants. Add - - - - - - - - - - - - - - - - - - 3 20

FOR 4½-INCH MANNINGTON SPECIAL OUTFIT, WITH DOUBLE TUG AND 9-INCH BRAKE IRONS

		Weight, lbs.	Each	Per Set
BAND WHEEL, 10 feet diameter, 12 inch face.	40 1-inch pine cants - - - - - -	170	$0 19	$7 60
TUG PULLEY on band wheel 7 feet diameter.	16 2½-inch grooved hemlock cants -	137	26	
	8 2½-inch plain hemlock cants - -	82	24	
	24 1 -inch pine cants - - - - - -	75	15	9 68
		294		
BULL WHEELS, 7½ feet diameter.	For Tug Side.			
	16 2½-inch grooved hemlock cants -	175	32	
	40 1 -inch pine cants - - - - - -	116	17	
	8 10 -inch oak arms - - - - - -	185	42	
	16 half handles - - - - - - - -	10	02½	
	For Brake Side.			
	8 2½-inch plain hemlock cants - -	97	30	
	56 1 -inch pine cants - - - - - -	166	17	
	8 10 -inch oak arms - - - - - -	165	42	
	16 half handles - - - - - - - -	10	02½	31 36
		924		

Complete set cants, arms and handles, as above - - - - - - - - - - - - - $48 64

BULL WHEELS, 8 feet diameter.	For Tug Side.			
	16 2½ inch grooved hemlock cants -	160	34	
	40 1 -inch pine cants - - - - - -	116	18	
	8 10 -inch oak arms - - - - - -	190	44	
	16 half handles - - - - - - - -	10	02½	
	For Brake Side.			
	8 2½-inch plain hemlock cants - -	100	32	
	56 1 -inch pine cants - - - - - -	170	18	
	8 10 -inch oak arms - - - - - -	190	44	
	16 half handles - - - - - - - -	10	02½	33 12
		946		

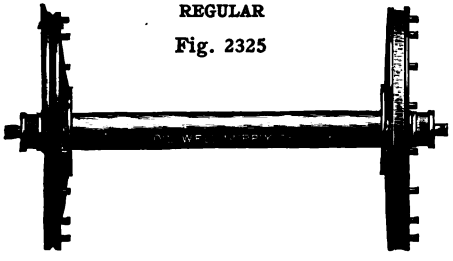
Complete set cants, arms and handles for 4½-inch double tug outfit, with 9-inch brake irons and 8-foot bull wheels - - - - - - - - - - $50 40

WOOD WORK FOR RIG IRON OUTFITS

BULL WHEELS

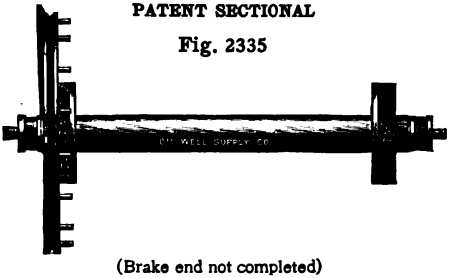
REGULAR

Fig. 2325



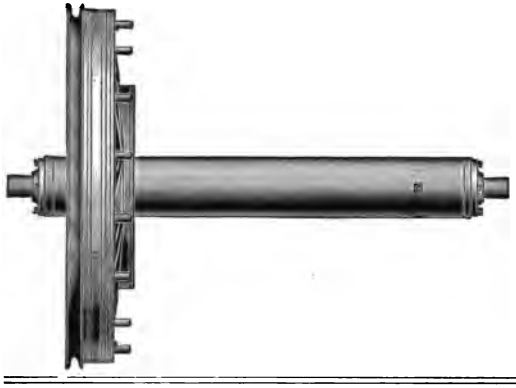
PATENT SECTIONAL

Fig. 2335



(Brake end not completed)

Fig. 2339 **EXTRA BULL WHEEL OR CALF WHEEL**



For position of calf wheel in rig, see page 16. One end of the shaft is built up to act as both tug and brake. This leaves free space for driller to stand while operating the engine.

It will be noted from the weights and measurements of bull wheels that they are too large for convenient handling and transportation. For that reason it is customary to ship them "knocked down."

The following list covers price of all parts of the bull wheels prepared for putting together at destination.

For sketch showing construction, see page 63.

	Weight, lbs.	Price
7½ ft. Bull Wheels, single tug	1,700	$50 00
7½ ft. Bull Wheels, double tug	1,825	56 00
8 ft. Bull Wheels, double tug	1,900	58 00
7½ ft. Bull Wheels, sectional	----	65 00
Calf Wheel, Fig. 2339	1,725	64 00

BULL WHEEL SHAFTS
WITH WING GUDGEONS
Fig. 2329

BULL WHEEL SHAFTS
WITH BOWL GUDGEONS
Fig. 2331

	Price, plain	Weight, plain	Price, ironed	Weight, ironed
Shaft for 3½ in. irons, 12 inches diameter, wing gudgeons	$11 00	800	$19 00	940
Shaft for 4 in. irons, 12 inches diameter, bowl gudgeons	13 00	800	21 00	940
Shaft for 4½ and 5 in. irons, 16 inches diameter, bowl gudgeons	17 00	1,000	26 00	1,144

For detailed price of other parts of Bull Wheels see: Gudgeons, page 56; Cants, Arms and Handles, pages 58 to 60; Calf Wheel Iron Rim, page 56.

WOOD WORK FOR RIG IRON OUTFITS

SECTIONAL BAND WHEELS AND TUG PULLEYS

Fig. 2320

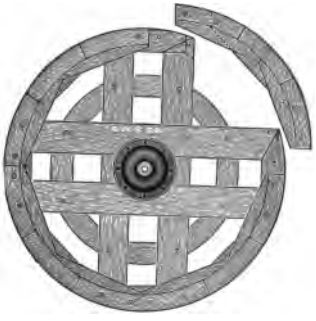
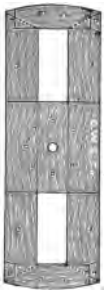


Fig. 2322



Section

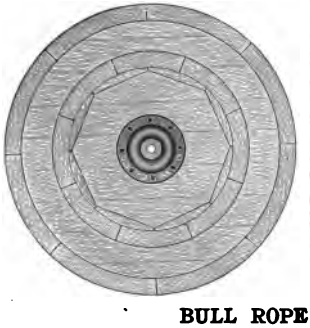
Fig. 2315

FIG. 2320

9 feet diameter, 8-inch face, made up, less flanges	$50 00
9 feet diameter, 10-inch face, made up, less flanges	56 00
9 feet diameter, 12-inch face, made up, less flanges	60 00
10 feet diameter, 10-inch face, made up, less flanges	61 00
10 feet diameter, 12-inch face, made up, less flanges	66 00

COMMON BAND WHEEL AND TUG PULLEY

TUG SIDE
Fig. 2310

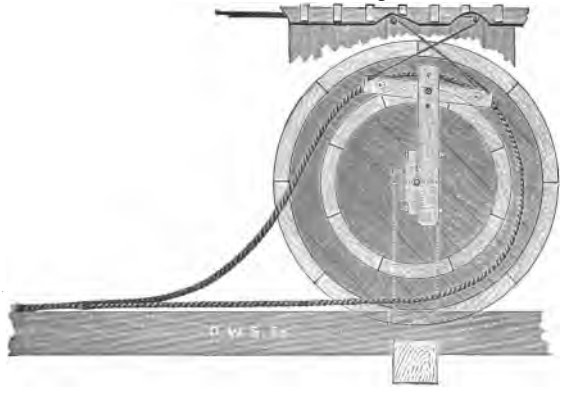


FACE
Fig. 2311

Figs. 2310 and 2311 show the standard band and tug wheels as they are made in the field. For detail of construction, see page 63. Fig. 2311 shows single tug only. When double tug is used the cants are built up on the outside of the first or single tug, thus making two grooves for the bull ropes or transmission. These standard band and tug wheels are the best for deep well work and should be built in the field, as a "made-up" wheel is too large and heavy for convenient shipment.

BULL ROPE PROTECTOR (IN USE) AND PARTS

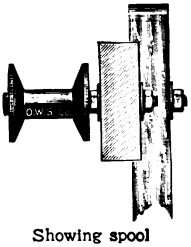
Fig. 2351



JACK POST SLEEVE
Fig. 2352

Showing section of the shaft passing through it.

OUTER END OF PROTECTOR
Fig. 2353

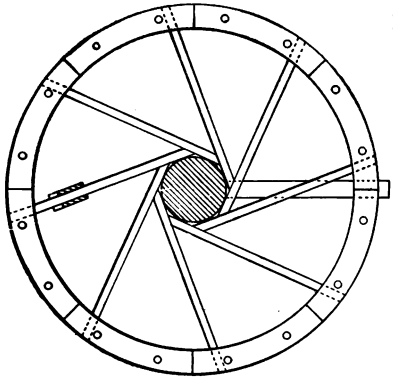


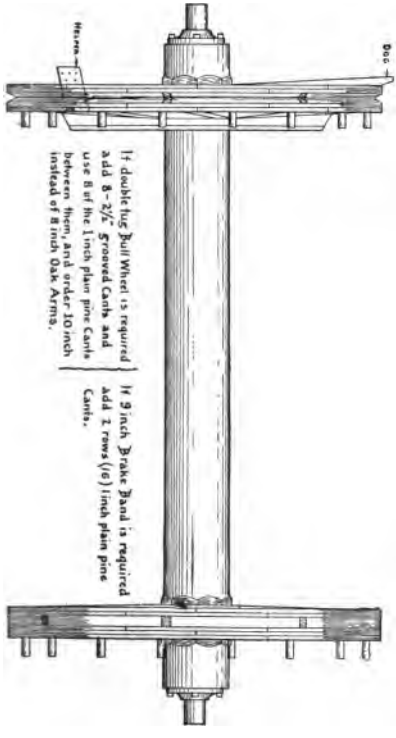
Showing spool attached

Prices quoted on application.

WOOD WORK FOR RIG IRON OUTFITS

Fig. 2347

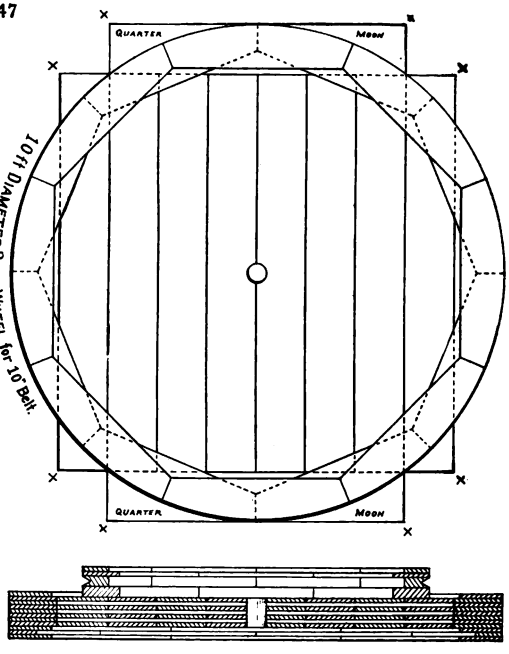




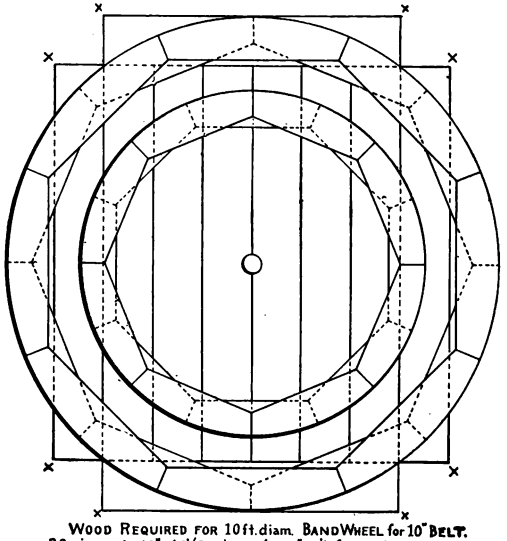
WOOD REQUIRED FOR 7½ ft. REGULAR BULL WHEELS.
1 Shaft, 8-2½" grooved Cants, 32-1 inch plain pine Cants, 8-8" Oak Arms, 16 Handles for Tug end and 8-2½" plain Cants, 40-1" plain pine Cants, 8-8" straight Oak Arms, 16 Handles for Brake end. 1 piece 2x4"x20' Oak for Dog and to nail to tug arms for protection of handles.

Saw corners X off as close to Cants as possible and smooth with Drawing Knife or Stick

10 ft. DIAMETER BAND WHEEL for 10" Belt.



If double tug is required on Band Wheel, add one row (8) 2½" grooved Cants and one row (8) 1 inch plain pine Tug Cants. If 12" Belt is to be used, add 4-1x12"x16' boards, 4 quarter moons and 8-1" plain pine Band Cants.



WOOD REQUIRED FOR 10 ft. diam. BAND WHEEL for 10" BELT.
28 pieces 1x12"x16' (56 pieces 1x12"x8') for Center.
14 " 1x12"x12" for 28 quarter Moons, 32-1" plain pine Band Cants, 8-2½" plain Tug Cants, 8-2½" grooved Tug Cants, 16-1" plain pine Tug Cants.

Diagrams showing the construction and manner of "building up" band, tug, and bull wheels. For specification of parts, see pages 58 to 60

WOODEN SAND REELS

MADE WITH EITHER WING OR BOWL GUDGEONS

STANDARD WITH WING GUDGEONS
Fig. 2368

SHORT NOSE WITH WING GUDGEONS
Fig. 2360

STANDARD WITH BOWL GUDGEONS
Fig. 2362

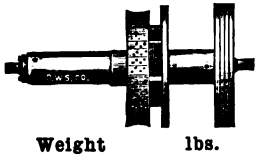
STANDARD WITH END LAGGINGS
Fig. 2383

STANDARD WITH WIRED LAGGINGS
Fig. 2366

EATON'S PATENT
Fig. 2370

	Price	Weight	Price	Weight	Price	Weight
Size - - - - - - - - - - inches	36	36	40	40	44	44
Fig. 2368 with oak shaft - - - - -	$19 00	650	------	----	------	------
Fig. 2362 with oak shaft - - - - -	21 00	700	$24 50	800	------	------
Fig. 2362 with oak shaft and oak head -	22 50	750	26 00	1,030	$30 00	------
Fig. 2383 with oak shaft - - - - -	------	---	28 50	950	33 00	------
Fig. 2366 with wired laggings - - -	20 00	650	26 50	800	35 00	------
Fig. 2370 with oak shaft - - - - -	25 00	---	27 00	----	------	------
Laggings per set (side) - - - - - -	2 75	---	3 75	----	3 75	------
Add for bands shrunk on nose end - -	------	---	1 75	- -	2 00	------

Fig. 2374



Weight lbs.

PATENT STRAIGHT LINE

36-inch - - - - - - - - - - - - - - - - - - - $30.00
Laggings per set - - - - - - - - - - - - - - - 5.00

The weight of the line draws the reel straight against the band wheel, thus securing smoothness and rapidity of motion.

SAND REEL GUDGEONS

CUP **BOWL**

Fig. 2403 **Fig. 2404** **Fig. 2401** **Fig. 2400**

Taper pin

Straight pin

Straight pin

Taper pin

Size reel for - - - inches	36	40
Per set (2) - - - - - - - -	$4 50	$5 50
Weight - - - - - - **lbs.**	**51**	**72**
Wing gudgeons - - per set	- - -	- - -
Bands - - - - - - - each	- - -	- - -

Size reel for - - - inches	36	40
Per set (2) less bands - - -	$5 00	$6 00
Weight, - - - - - **lbs.**	**66**	**72**
Bands - - - - - - - each	50	- - -
Weight, each - - - - **lbs.**	**5**	- - -

MALLEABLE IRON SPOOL

Fig. 2394

For wire sand line
Weight 266 lbs.

Size shaft for - in.	10	10	10	12	12	12
Size drum - - in.	14	16	20	14	16	20

All sizes, each - - - - - - - $27 00

FURMAN PATENT ADJUSTABLE SAND REEL CONNECTION

Fig. 2410

This secures the proper adjustment between the band wheel and the sand reel pulley. As the pulley wears smaller the adjustment is changed so that the pulley is kept at its proper point of contact with the band wheel. Price, $10.00.

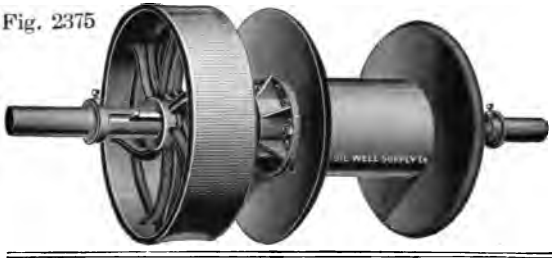
IRON SAND REELS

OKLAHOMA REEL

Fig. 2391

	Weight, lbs.	Price.
Complete -	1226	$ 80 00
Pulley only -	390	28 00
Flanges, per set (2) - - - - - - - - - - - - - - - - - - -	400	25 00
Drum only -	102	6 00
Collars, per set (2) - - - - - - - - - - - - - - - - - - -	14	2 00
Shaft, 4 inch x 7 feet, 1¼ inches - - - - - - - - - - - - - -	300	20 00
Double end bolts, per set (6) - - - - - - - - - - - - - - -	16	1 50
Key, ⅞ x 8 inch -	2	1 25
Keys, ⅞ x 6 inch, per set (2)- - - - - - - - - - - - - - - -	3	1 50

Fig. 2375

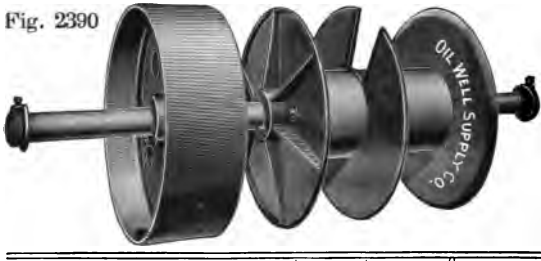


IRON SAND REELS

California Single Drum Iron Sand Reels are made both with cast iron flanges and pressed steel flanges. If there is a preference for either, the order must so indicate, otherwise orders may be filled with either cast iron or steel flanges.

	Weight, lbs.	Price.
Complete with 34 x 10 inch open arm pulley	1372	$93 00
Complete with 34 x 10 inch web pulley	1415	96 00
Complete with 38 x 12 inch open arm pulley	1400	98 00
Complete with 38 x 12 inch web pulley	1445	100 00
Pulley only, 34 x 10 inch, open arm	425	30 00
Pulley only, 34 x 10 inch, web	468	35 00
Pulley only, 38 x 12 inch, open arm	496	36 00
Pulley only, 38 x 12 inch, web	540	39 00
Flanges, per set (2)	326	27 00
Drum only	238	13 50
Collars, per set (2)	18	2 00
Shaft, 4 inch x 8 feet	345	22 50
D. E. Bolts, per set (3)	16	1 00
Key, $\frac{7}{8}$ x 8 inch	2	1 25
Keys, $\frac{7}{8}$ x 6 inch, per set (2)	3	1 75

Fig. 2390



California Double Drum Iron Sand Reels are made in different sizes and with either cast iron or pressed steel flanges. If there is a preference for either style of flange the order must so indicate, otherwise no distinction will be considered.

With 36 inch Diameter Flanges.	Weight, lbs.	Price.	With 40 inch Diameter Flanges. (Pressed Steel Only.)	Weight, lbs.	Price.
Complete with 34 inch Open Arm Pulley	1545	$105 00	Complete with 42 inch Open Arm Pulley	1810	$130 00
Complete with 34 inch Web Pulley	1583	110 00	Complete with 42 inch Web Pulley	1900	135 00

PARTS.	36 INCH REEL		40 INCH REEL	
	Weight, lbs.	Price.	Weight, lbs.	Price.
Open arm pulley only	471	$32 00	700	$50 00
Web pulley only	509	37 00	790	56 00
Outside flanges, per set (2)	396	24 00	348	30 00
Center flange	167	10 00	256	20 00
Long drum	101	6 00	45	2 50
Short drum	75	5 00	45	2 50
Double end bolts, per set (3)	13	1 00	18	1 50
Shaft, 4 inch	342	24 00	385	27 00
Collars, per set (2)	13	2 00	13	2 00
Key, $\frac{7}{8}$ x 8 inch	2	1 00	2	1 00
Keys, $\frac{7}{8}$ x 6 inch, per set (2)	3	1 50	3	1 50

IRON SAND REELS

KANSAS REEL

Fig. 2386

	Weight, lbs.	Price
Complete	1,026	$70 00
Pulley only	447	32 00
Flanges per set (2)	316	20 00
Collars per set (2)	11	1 50
Shaft, 3 in. x 8 ft. 5 in.	200	12 00
Drum only	48	4 00
Keys per set (3)	4	2 00

The Knupp Iron Sand Reel, Fig. 2389. Showing the reel ready for use and K. D. ready to ship.

This reel is furnished with all Knupp Rigs, see Fig. 1278. page 29 and can be used with our Standard Rigs.

Weight 1150 lbs. Price $65 00.

Fig. 2387

IRON SHAFT SAND REEL

Friction, brake pulley and flanges detachable. The friction pulley is built up of wooden segments secured between metal flanges.

SAND REEL BRAKE LEVER AND REACH STRAP

Fig. 2377

FOR USE WITH IRON SAND REELS

WEIGHT 75 LBS.

Levers, each	$5 00
Reach straps, each	1 50

SPECIFICATION FOR 3½-INCH REGULAR RIG IRON OUTFIT

	Weight, lbs.		Weight, lbs.
1 shaft, crank, collar and wrist pin	330	8 D. E. bolts, ⅞ x 18 inches	105
1 pair flanges with keys and bolts	210	Machine bolts, 1 ¾x6 in., 2 ¾x10 in., 10 ¾ x 14 or 16 in., 1 ¾x18 in., 2 ¾x22 in., 1 1x20 in.	
1 set center irons complete	279		
1 stirrup with bolts	65		
2 wing gudgeons with 4 bands	140	24 ¾ and 8 ⅞ in. cast-iron washers	
1 derrick or crown pulley, 18-inch	75	24 ¾-inch wrought-iron washers	
1 sand pump pulley, 13-inch	41	Nails, 150 lbs. 10d, 50 lbs. 20d, 125 lbs. 30d.	325
1 brake band ¼ x 5 inches x 26 feet	105	1 36-in. standard oak shaft sand reel	650
1 brake lever, 1½ inches x 9 feet	60	1 set 7½-ft. bull wheel cants, arms and handles,	740
1 brake staple, 5-inch	3	1 set 9-ft. band wheel cants	284
1 back brake, 8 inches x 8 feet	22	1 set 6½-ft. tug pulley cants	

For number and sizes of cants, see page 58.

SPECIFICATION FOR NORTHERN OHIO AND INDIANA RIG IRON OUTFIT

	Weight, lbs.		Weight, lbs.
1 4-in. shaft, crank, collar and wrist pin	497	8 D. E. bolts, ¾x16 in.	100
1 pair 4-in. flanges with keys and bolts	353	Machine bolts, 4 ¾x18 in., 8 ¾x16 in., 2 ¾x14 in., 2 ¾x12 in., 2 ¾x10 in., 5 ¾x8 in.	
1 set 3½-in. center irons complete	279		
1 3½-in. stirrup with bolts	65		
2 3½-in. wing gudgeons with 4 bands	140	26 ¾-in. cast-iron washers	
1 derrick or crown pulley, 18 in.	75	26 ¾-in. wrought-iron washers	
1 sand pump pulley, 13 in.	41	Nails, 100 lbs. 10d, 100 lbs. 20d, 100 lbs. 30d,	300
1 brake band, ¼ in. x 5 in. x 26 ft.	105	1 36-in. standard oak shaft sand reel	650
1 brake lever, 1½ in. x 9 ft.	60	1 set 7½-ft. bull wheel cants, arms and handles,	603
1 brake staple, 5 in.	3	1 set 9-ft. band wheel cants	285
1 back brake, 8 in. x 8 ft.	22	1 set 6½-ft. tug pulley cants	

For number and sizes of cants, see page 59.

SPECIFICATION FOR 4-INCH REGULAR RIG IRON OUTFIT

	Weight, lbs.		Weight, lbs.
1 shaft, crank, collar and wrist pin	497	8 D. E. bolts, ⅞x18 in.	105
1 pair flanges with keys and bolts	353	Machine bolts, 2 ¾x22 in., 1 ¾x18 in., 10 ¾x14 or 16 in., 2 ¾x10 in., 1 ¾x6 in., 1 1x20 in.	
1 set center irons complete	368		
1 stirrup with bolts	84		
2 bowl gudgeons with 2 bands and 8 bolts	200	24 ¾-in. and 8 ⅞-in. cast-iron washers	
1 derrick or crown pulley, 30 in.	280	24 ¾-in. wrought-iron washers	
1 sand pump pulley for wire line, 24 in.	90	Nails. 175 lbs. 10d, 75 lbs. 20d, 150 lbs. 30d,	400
1 brake band, ¼ in. x 7 in. x 26 ft	152	1 40-in. standard oak shaft sand reel	950
1 brake lever, 1¾ in. x 9 ft.	75	1 set 7½-ft. bull wheel cants, arms and handles,	746
1 brake staple, 7 in.	6	1 set 10-ft. band wheel cants	362
1 back brake, 10 in. x 8 ft.	45	1 set 7-ft. tug pulley cants	

For number and size of cants, see page 59.

SPECIFICATION FOR 4½-INCH REGULAR RIG IRON OUTFIT

	Weight, lbs.		Weight, lbs.
1 shaft, crank, collar and wrist pin	552	8 D. E. bolts, ⅞x18 in.	105
1 pair flanges with keys and bolts	386	Machine bolts, 1 ¾x6 in., 2 ¾x10 in., 10 ¾x14 in. or 16 in., 1 ¾x18 in., 2 ¾x22 in., 1 1x20 in.	
1 set center irons complete	368		
1 stirrup with bolts	84		
2 bowl gudgeons with 2 bands and 8 bolts	200	24-¾ in. and 8 ⅞-in. cast-iron washers	
1 derrick or crown pulley, 30 inch	280	24-¾ in. wrought-iron washers	
1 sand pump pulley for wire line, 24 inch	90	Nails, 175 lbs. 10d, 75 lbs. 20d, 150 lbs. 30d,	400
1 brake band, ¼ in. x 7 in. x 26 ft.	152	1 40-in. standard oak shaft sand reel	950
1 brake lever, 1¾ in. x 9 ft.	75	1 set 7½-ft. bull wheel cants, arms and handles,	746
1 brake staple, 7 in.	6	1 set 10-ft. band wheel cants	362
1 back brake, 10 in. x 8 ft.	45	1 set 7½-ft. tug pulley cants	

For number and sizes of cants, see page 59.

SPECIFICATION FOR 4½-INCH DOUBLE TUG RIG IRON OUTFIT

	Weight, lbs.		Weight, lbs.
1 shaft, crank, collar and wrist pin	552	8 D. E. bolts, ⅞x18 in.	200
1 pair flanges with keys and bolts	386	Machine bolts, 12 ¾x20 in., 10 ¾x18 in., 2 ¾x16 in., 2 ¾x14 in., 20 ¾x12 in., 4 ¾x10 in., 4 ¾x8 in., 10 ⅞x18 in.	
1 set center irons complete	368		
1 stirrup with bolts	84		
2 bowl gudgeons with 2 bands and 8 bolts	200	32 ¾-in. and 8 ⅞-in. cast-iron washers	
1 derrick or crown pulley, 30-inch	280	40 ¾-inch wrought-iron washers	
1 sand pump pulley for wire line, 24 in.	90	Nails, 150 lbs. 10d, 100 lbs. 20d, 200 lbs. 30d,	450
1 brake band, ¼ in. x 7 in. x 28 ft.	175	1 40-in. standard oak head and oak shaft sand reel	1,030
1 brake lever, 1¾ in. x 9 ft.	75		
1 brake staple, 7-in.	6	1 set 7½-ft. bull wheel cants, arms and handles,	869
1 back brake, 10-in. x 8 ft.	45	1 set 10-ft. band wheel cants	464
1 jack post box	60	1 set 7-ft. tug pulley cants	

For number and sizes of cants, see pages 59 and 60.

NOTE—Where 9-inch brake irons are used, substitute 8 10-inch oak arms instead of 8 inch, on brake side of bull wheel, and add 16 1-inch pine cants.

SPECIFICATION FOR 4½-INCH MANNINGTON RIG IRON OUTFIT

	Weight, lbs.
1 shaft, crank, collar and wrist pin	552
1 pair flanges with keys and bolts	386
1 set center irons complete	368
1 stirrup with bolts	84
2 bowl gudgeons with 2 bands and 8 bolts	200
1 derrick or crown pulley, 30 inch	280
1 sand pump pulley for wire line, 24 inch	90
1 brake band, ¼ inch x 9 inches x 28 feet	213
1 brake lever, 1¾ inches x 9 feet	75
1 brake staple, 9-inch	8
1 back brake, 10 inches x 10 feet	55
1 jack post box	60
8 D. E. bolts, ⅞ x 18 inches	200
Machine bolts, 12 ¾x20 in., 10 ¾x18 in. 2 ¾x16 in., 2 ¾x14 in., 20 ¾x12 in., 4 ¾x10 in., 4 ¾x8 in., 10 ⅞x18 in., 32 ¾ in. and 8 ⅞ in. cast-iron washers, 40 ¾ in. wrought-iron washers	
Nails, 150 lbs. 10d, 100 lbs. 20d, 200 lbs. 30d,	450
1 40 in. oak head and oak shaft sand reel	1,030
1 set 8 ft. bull wheel cants, arms and handles,	946
1 set 10 ft. band wheel cants	464
1 set 7 ft. tug pulley cants	

For number and sizes of cants, see page 60.

SPECIFICATION FOR CALIFORNIA RIG IRON OUTFIT

	Weight, lbs.
1 4½ in. x 6½ ft. shaft, crank, collar and wrist pin	552
1 pair flanges with keys and bolts	386
1 set center irons complete	368
1 stirrup with bolts	84
2-bowl gudgeons with 2 bands and 8 bolts	200
1 derrick or crown pulley, 30 in.	280
1 sand pump pulley for wire line, 24 in.	90
1 brake band, ¼ in. x 7 in. x 26 ft.	152
1 brake lever, 1¾ in. x 9 ft.	75
1 brake staple, 7 in.	6
2 jack post eye bolts, 1¼ in. x 8 ft., with nuts and washers	67
2 hook rods, ¾ in. x 8 ft., with nuts and washers 1 end	30
2 eye bolts, ¾x16 in., with nuts and washers 1 end	8
2 bolts, 1x24 in., with nuts and washers 1 end,	11
2 draw bolts, ¾ in. x 7½ ft., with nuts and washers	30
1 jack post stirrup	38
1 iron sand reel, 4-in. shaft	1,372
1 sand reel lever	55
1 set 7½-ft. bull wheel cants, arms and handles,	735
1 set 9-ft. band wheel cants	235
1 set 6½-ft. tug pulley cants	

CALF WHEEL OUTFIT

1 90-in. rim with 8 ¾x9 in. bolts	355
1 48-in. outer tug wheel for band wheel shaft,	423
1 shaft, 9 ft., with bowl gudgeons, bands and bolts	600
1 brake band, ¼ in. x 5 in. x 28 ft.	115
1 brake lever and staple, 1½ in. x 10 ft.	65
2 crown pulleys for wire line, 22 in.	220
8 plain cants, 2½ in., 40 1 in. plain pine cants 8 oak arms, 8 in., 16 handles, for 7½ ft. wheel	427
Machine bolts, 32 ½x6 in., 16 ½x12 in., 2 ¾x8 in., 8 ¾x9 in., 4 ¾x10 in., 4 ¾x12 in., 14 ¾x14 in., 14 ¾x16 in., 2 ¾x18 in., 6 ¾x20 in., 2 ¾x22 in., 2 ¾x24 in., 2 ¾x26 in., 2 ¾x28 in., 2 ¾x36 in.	188
125 ¾-in. cast-iron washers	70
6 lbs. ¾-in. and 2 lbs. ½-in. wrought-iron washers	8
Nails, 150 lbs. 10d, 100 lbs. 20d, 200 lbs. 30d,	450

For number and sizes of cants, see pages 58-59. For foundry rig irons, see pages 54-56.

SPECIFICATION FOR 5-INCH RIG IRON OUTFIT

	Weight, lbs.
1 shaft, crank, collar and wrist pin	663
1 pair flanges with keys and bolts	415
1 set center irons complete	368
1 stirrup with bolts	84
2-bowl gudgeons with 2 bands and 8 bolts	200
1 derrick or crown pulley, 30 in.	280
1 sand pump pulley for wire line, 24 in.	90
1 brake band, ¼ in. x 9 in. x 28 ft.	213
1 brake lever, 1¾ in. x 9 ft.	75
1 brake staple, 9 in.	8
1 back brake, 10 in. x 10 ft.	55
1 jack post box	60
8 D. E. bolts, ⅞x18 in.	200
Machine bolts, 10 ¾x18 in., 4 ¾x10 in., 20 ¾x12 in., 2 ¾x14 in., 2 ¾x16 in., 12 ¾x20 in., 10 ⅞x18 in., 4 ¾x8 in. - 32 ¾-in. and 8 ⅞-in. cast iron washers - 40 ¾-in. wrought-iron washers	
Nails, 150 lbs. 10d, 100 lbs. 20d, 200 lbs. 30d,	450
1 40-in. oak head and oak shaft sand reel	1,030
1 set 7½-ft. bull wheel cants, arms and handles,	869
1 set 10-ft. band wheel cants	464
1 set 7-ft. tug pulley cants	

For number and sizes of cants, see 4½-inch regular, with double tug, pages 59 and 60.

It will be observed that bull wheel shafts are not included in any of the foregoing specifications. This is due to the custom throughout the older oil fields of cutting the shafts from timber procured locally. Where such is not available, orders for rig iron outfits should clearly specify shafts, otherwise they will not be shipped. For weights and prices, see page 61.

RIG BUILDERS' OUTFIT

ARTICLES	Fig. No.	See pages
4 Double bit axes and handles	5589–5696	313-322
1 Broad axe and handle	5591	313
2 Adzes and handles	5600–5702	314-322
1 Crosscut saw and handles	5652–4–5	316
2 No. 7 Disston hand saws	5646	315
1 Saw vise	5657	316
1 Crosscut saw set	----	---
1 Hand saw set	5644	316
1 Raker gauge	----	---
1 Dozen 8-inch flat bastard files	5731	317-318
1 Dozen 5-inch slim taper saw files	5736	318
6 No. 3 oil king hatchets	5594	313
2 No. 7 steel squares	5667	321
1 No. 2 spirit level	5612	321
1 Plumb bob	----	---
1 1½-inch socket firmer chisel	5626	314
1 1½-inch socket firmer gouge	5628	314
1 3-inch slick	5632	314
1 10-inch common draw knife	5614	314
1 Pair 10-inch dividers	----	---
1 100-foot heavy chalk line	----	---
1 100-foot light chalk line	----	---
1 Dozen balls blue chalk	----	---
1 2-inch auger	5575–5577	319
1 1½-inch auger	5575–5577	319
1 1-inch ship auger	5583	319
4 No. 24 Swans auger handles	5720	322
1 12-pound sledge and handle	2441–5700	277-322
1 Wood mallet	----	---
1 Spike maul	----	---
2 Iron wedges	----	---
2 Mattocks and handles	5538–5698	317-322
2 No. 2 D. H. shovels	5815	328
1 7-inch single wrought iron pulley block	5303	308
1 Pulley	5692	277
1 Pulley hook (dog)	----	---
1 Crow bar	----	---
1 15-inch combination wrench	5183	273
1 12-inch screw wrench	----	---
4 Socket peavies	5808	327
3 Feet ¾-inch octagon steel	----	---
185 Feet 1¼-inch plain rope	----	---
185 Feet ⅞-inch plain rope	----	---

The Rig Builders' Outfit, consisting of tools as specified, is complete, and such as is used by the practical rig builders throughout the oil country. We can supply the entire outfit, packed in a substantial chest measuring 6 feet x 2 feet x 18 inches. Price, $75.00.

Weight complete, 450 pounds.

OIL COUNTRY BOILER

LOCOMOTIVE TYPE

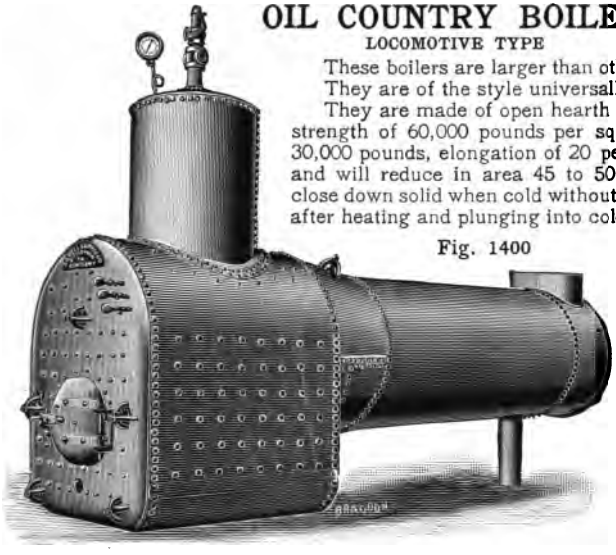


Fig. 1400

These boilers are larger than other makes for the same power. They are of the style universally used for drilling wells.

They are made of open hearth flange steel, having a tensile strength of 60,000 pounds per square inch, an elastic limit of 30,000 pounds, elongation of 20 per cent in an 8-inch section, and will reduce in area 45 to 50 per cent and turn over and close down solid when cold without fracture, and will do the same after heating and plunging into cold water and will not blister.

These boilers have unusual fire box surfaces, and storage room for steam.

They are double riveted in the longitudinal seams. They do not foam or prime under any ordinary circumstances, even with quite foul water.

Every boiler is carefully inspected at 160 pounds hydrostatic pressure and 125 pounds steam pressure per square inch.

SPECIFICATIONS OF OIL COUNTRY BOILERS

LOCOMOTIVE TYPE

Horse power		15	20	25	30	40
Length of boiler		12′ 8″	13′ 8″	13′ 10″	15′ 10″	15′ 10″
Height of boiler		6′ 0″	7′ 6″	7′ 11″	8′ 7″	9′ 1″
Diameter of boiler	inches	30	36	38	42	44
Diameter of dome	inches	22	28	30	32	36
Height of dome	inches	25	33	36½	36½	39½
Length of furnace	inches	48	48	50	50	50
Height of furnace	inches	30	36	38	42	44
Width of furnace	inches	30	36	38	42	44
Number of tubes		30	36	43	48	54
Length of tubes	feet	7	8	8	10	10
Diameter of tubes	inches	3	3	3	3	3
Thickness of wagon top	inches	¼	¼	¼	¼	¼
Thickness of fire box	inches	¼	¼	¼	¼	¼
Thickness of waist or shell	inches	¼	¼	¼	¼	¼
Thickness of dome	inches	¼	¼	¼	¼	¼
Thickness of flue sheet, rear	inches	11/32	3/8	3/8	3/8	7/16
Thickness of flue sheet, fire box end	inches	11/32	3/8	3/8	7/16	7/16
Thickness of dome head	inches	5/16	5/16	5/16	5/16	5/16
Thickness of front of boiler	inches	5/16	5/16	5/16	5/16	5/16
Thickness of throat sheet	inches	5/16	5/16	5/16	5/16	5/16
Thickness of reducer	inches	¼	¼	¼	¼	9/32
Thickness of rouse ring	inches	¼	¼	¼	¼	¼
Thickness of front furnace head	inches	5/16	5/16	5/16	5/16	5/16
Diameter of rivets	inches	¾	¾	¾	¾	¾
Length of smoke stack	feet	25	25	25	30	32
Diameter of smoke stack	inches	16	18	20	22	24
Steam opening in dome	inches	3	3	3	3	3
Diameter of pop valve	inches	2	2	2	2	2
Weight	lbs.	**4,350**	**5,800**	**6,500**	**7,800**	**8,600**
Price		$425 00	435 00	465 00	575 00	725 00

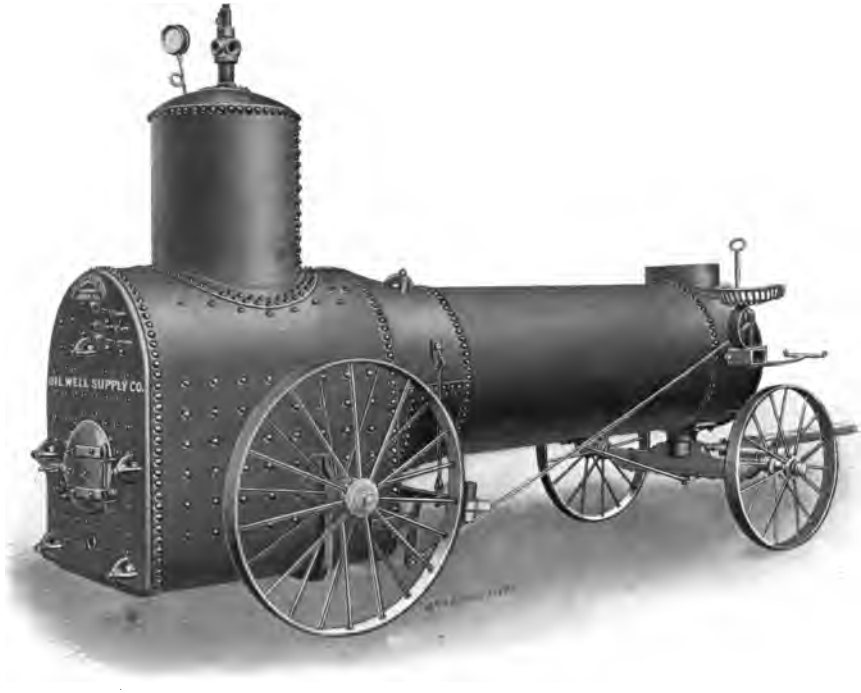
Staybolts are ⅞-inch diameter and are placed 5 inches apart.

Fixtures for these boilers include either lever safety or O. W. S. Co. pop safety valve as desired; grates, grate rests, steam gauge, three gauge cocks, blow-off cock, feed and check valves, four nipples, stack, and guy wires with hooks.

MOUNTED PORTABLE BOILER

LOCOMOTIVE TYPE

Fig. 1405



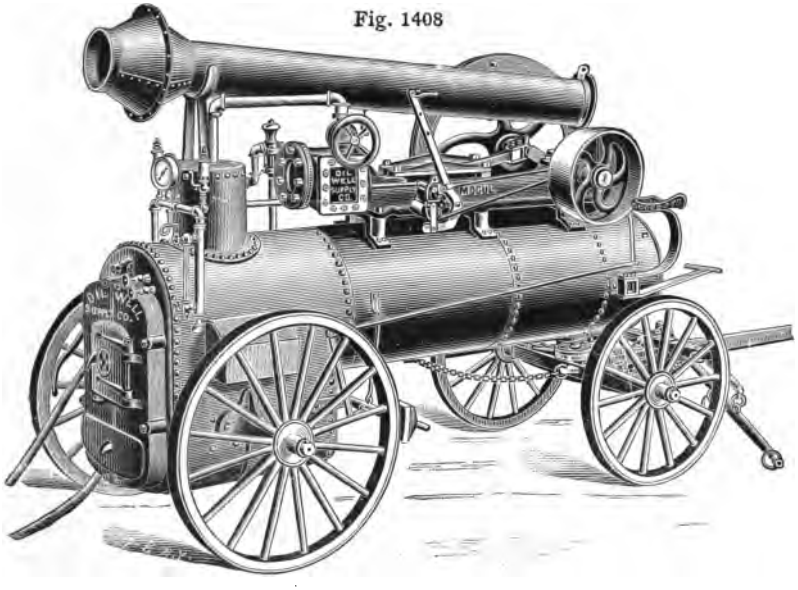
The wheels are made with heavy cast-iron hubs and wrought-iron spokes and rims. The axles are heavy forgings, strongly attached to boiler. We carry in stock, 15, 20 and 25 horse-power boilers, mounted as shown in illustration. Specifications and descriptions same as locomotive type boilers, page 71.

Horse power	15	20	25	30	40
Weight - - - - - - - - - - lbs.	**6,000**	**7,600**	**8,500**	**10,000**	**11,000**
Price - - - - - - - - - - - -	$575 00	585 00	627 00	750 00	900 00

ENGINE AND BOILER FOR DRILLING WELLS

MOUNTED ON WHEELS OR SKIDS

Fig. 1408



MOUNTED T BOILER

Fig. 1411

For specifications, see page 74.

MOUNTED DRILLING BOILER AND ENGINE SPECIFICATIONS, FIG. 1408

Number of size	1	2	3	4	5
Horse power, as usually rated	6	8	10	12	15
Diameter of cylinder and length of stroke - inches	5 x 6	6 x 8	7 x 10	8 x 10	8 x 12
Usual number of revolutions	230	220	175	175	150
Diameter of boiler - inches	26	28	30	32	32
Length of furnace, inside - inches	34	36	38	38	44
Width of furnace, inside - inches	21	22	24	26	26
Height of furnace - inches	29	33	35	35	35
Number of tubes (all 3 inch)	17	20	22	26	26
Length of tubes - inches	60	72	78	78	78
Diameter of stack - inches	12	14	14	16	16
Length of stack - feet	18	20	20	20	20
Weight complete, on skids - about	**4,200**	**5,000**	**6,100**	**6,500**	**7,400**
Weight complete, mounted on wheels - about	**4,300**	**5,100**	**6,200**	**6,600**	**7,600**

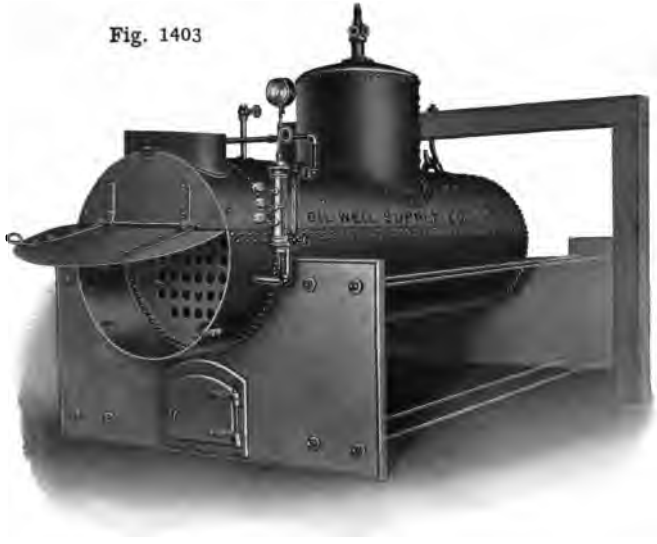
Prices on application

MOUNTED T BOILER SPECIFICATIONS

Fig. 1411, see page 73

Diameter of body	inches	44
Height over all	inches	84
Diameter of shell	inches	34
Length of boiler	feet	10
Length of fire box	inches	36
Width of fire box	inches	36
Height of fire box	inches	36
Diameter of smoke stack	inches	18
Length of smoke stack	feet	27
Length of tubes	feet	6
Number of 3 inch tubes		36
Weight of boiler	**pounds**	**4960**
Price		$380 00

Fig. 1403



HORIZONTAL TUBULAR DRILLING OR PUMPING BOILER

CALIFORNIA TYPE

These boilers are built for general service, but were especially designed to meet a demand in the California oil fields where the natural "adobe" is used in place of brick to close in the boiler. They make steam rapidly and freely, and are easily handled and set up. Care should be observed in placing orders to state whether wood, coal, oil, or gas will be used as fuel, and proper fittings for either will be furnished with the boiler.

Fixtures furnished with California type boilers include smoke stack, guy wires, four-way steam head with pop safety valve, steam gauge complete, water column with three gauge cocks, blow-off cock, and feed valve.

Fittings, including front and rear castings, tie bolts, and grate bars, are furnished only when ordered, as they vary to conform with the fuel to be used.

SPECIFICATIONS

Horse power as usually rated	25	30	35	40	45
Diameter of boiler - inches	36	40	42	46	48
Length of tubes - feet	12	12	12	12	12
Length of britchen - inches	16	16	16	16	16
Number of tubes - 3-inch diameter	26	34	40	42	48
Diameter of dome - inches	28	30	32	36	36
Height of dome - inches	28	28	28	30	30
Length of grates - inches	42	42	45	48	48
Width of grates - inches	36	40	42	46	48
Total grate surface - square feet	10.5	11.66	13.12	15.33	16
Diameter of smoke stack - inches	20	20	22	22	24
Length of smoke stack - feet	25	25	25	25	25
Size of steam outlet - inches	3	3	3	3	3
Size of pop-safety valve - inches	2	2½	2½	2½	2½
Size of blow-off valve - inches	2	2	2	2	2
Thickness of shell - inches	5/16	5/16	5/16	5/16	5/16
Thickness of heads - inches	3/8	3/8	3/8	3/8	7/16
Thickness of dome shell - inches	9/32	9/32	9/32	5/16	5/16
Thickness of dome head - inches	5/16	5/16	5/16	11/32	11/32
Weight of boiler, about - lbs.	**3,440**	**3,800**	**4,605**	**4,900**	**5,575**
Weight of fixtures, about - lbs.	**2,232**	**2,294**	**2,378**	**2,653**	**2,703**
Weight of boiler and fixtures, about - lbs.	**5,672**	**6,094**	**6,983**	**7,553**	**8,278**
Price	$270 00	310 00	350 00	375 00	425 00

Grate bars, when required, extra

FRONT AND REAR CASTINGS AND TIE BOLTS FOR CALIFORNIA TYPE BOILERS

EXTRA AS FOLLOWS:

For 25 horse-power boiler, complete	$64 00
For 30 horse-power boiler, complete	65 00
For 35 horse-power boiler, complete	66 00
For 40 horse-power boiler complete	67 50

BOILER TOOLS AND ATTACHMENTS

Smoke stacks	per lb.,	$0 10
Grate bars	per lb.,	05

BOILER GRATE BAR REST

Fig. 3134

Per set of two - $2 50

Weight per set, 21 lbs.

BOILER TOOLS AND ATTACHMENTS

BOILER TUBES

Size outside diameter, inches	Price per foot	Thickness, inches	Thickness nearest Bgm. W. G.	Nominal weight per foot
1	$0 30	.095	13	.90
1¼	28	.095	13	1.15
1½	27	.095	13	1.40
1¾	22	.095	13	1.66
2	20	.095	13	1.91
2¼	24	.095	13	2.16
2½	28	.109	12	2.75
2¾	34	.109	12	3 04
3	35	.109	12	3.33
3¼	40	.120	11	3.96
3½	44	.120	11	4.28
3¾	50	.120	11	4.60
4	55	.134	10	5.47
4½	62	.134	10	6 17
5	75	.148	9	7.58
6	1 00	.165	8	10.16
7	1 20	.165	8	11.90
8	1 50	.165	8	13.65
9	1 70	.180	7	16.76
10	2 10	.203	6	21.00
11	2 50	.220	5	25.00
12	2 90	.229	4½	28.50
13	3 20	.238	4	32.06
14	3 65	.248	3½	36.00
15	4 10	.259	3	40.60
16	4 60	.270	2½	45 20

The above prices are for tubes up to 20 feet long—for tubes in excess of that length, 10 per cent will be added to net of invoice.

Extra thickness of tubes will be charged as per list of extra gauges.

Extra heavy or hydraulic tubes.

Special prices given on application.

Patent boiler connection for 1 inch pipe, each.....$1.10

BOILER TUBE SAFE ENDS

Not illustrated.

To 6 inches long. Over 6 inches long, extra length will be charged in proportion.

Size	2	2¼	2½	2¾	3	3¼	3½	3¾	4	4½	5	6
Price	$0 13	14	16	20	20	22	25	27	29	32	37	45

FLUE PLUGS

Fig. 3122

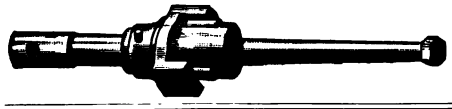
Sq. Head

Size flue - - - - - - - - - inches	2½	3
Fig. 3122 - - - - - - - - - - -	$0 35	45
Weight - - - - - - - - - - lbs.	2.5	4
Fig. 3124 - - - - - - - - - - -	$0 25	35
Weight - - - - - - - - - - lbs.	2	3

Fig. 3124

Plain

BOILER TOOLS AND ATTACHMENTS



DUDGEON TYPE TUBE EXPANDERS
Fig. 3105

Diameter - - - inches	1	1¼	1½	1¾	1⅞	2	2¼	2½	2¾
Price - - - - - - - - -	$10 00	10 00	10 00	10 00	10 00	10 00	12 00	14 00	16 00

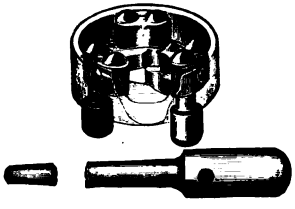
Diameter - - - inches	3	3¼	3½	3¾	4	4¼	4½	5	6
Price - - - - - - - - -	$18 00	20 00	23 00	25 00	30 00	35 00	40 00	50 00	60 00

DUDGEON TUBE EXPANDER PARTS

Size - - - - - - inches	1	1¼	1½	1¾	1⅞	2	2¼	2½	2¾
Mandrels - - - - - each	$1 00	1 50	1 75	2 00	2 50	2 50	3 00	3 50	3 50
Rolls, per set (3) - - - -	50	60	70	80	90	1 00	1 15	1 30	1 45

Size - - - - - - inches	3	3¼	3½	3¾	4	4¼	4½	5	6
Mandrels - - - - - each	$4 00	4 50	5 00	5 75	6 50	7 25	8 00	10 00	15 00
Rolls, per set (3) - - - -	1 60	1 75	2 00	2 25	2 50	3 00	3 50	4 00	5 00

These dimensions refer to the external diameter of Tube.



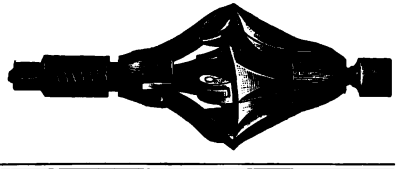
GILES' TUBE EXPANDERS, Fig. 3107
ADJUSTABLE THREE ROLLER. PATENTED.

No. 100. Expands 2, 2¼, 2½, 2¾ and 3 inch tubes - - $15 00
No. 200. Expands 3, 3¼, 3½, 3¾ and 4 inch tubes - - 25 00

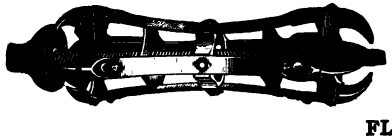
FLUE CLEANERS

FREEMAN'S
Fig. 3100

INGALL'S
Fig. 3101



Size of flue - - - - inches	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Freeman's Fig. 3100 - - -	$1 75	2 00	2 25	2 50	2 75	3 00	3 25	3 50	3 75	4 00
Ingall's Fig. 3101 - - - -	1 75	2 00	2 25	2 50	2 75	3 00	3 25	3 50	3 75	4 00

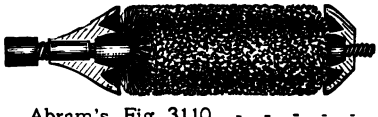


ENGINEER'S FAVORITE, Fig. 3103

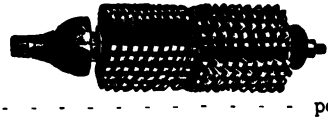
Size of flue - - in.	2	2¼	2½	3	3½	4
Price - - - -	$2 00	2 25	2 50	3 00	3 50	4 00

FLUE BRUSHES

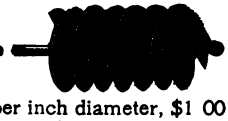
ABRAM'S
Fig. 3110



ABRAM'S EXPANSION
Fig. 3112

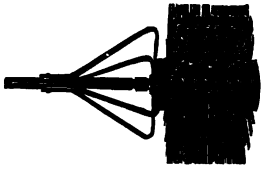


SPIRAL
Fig. 3114



Abram's, Fig. 3110 - - - - - - - - - - - - - - - - - per inch diameter, $1 00
Abram's expansion, Fig. 3112 - - - - - - - - - - - - - per inch diameter, 1 00
Spiral, Fig. 3114 - - - - - - - - - - - - - - - - - - per inch diameter, 1 00

BOILER TOOLS AND ATTACHMENTS



STEEL WIRE FLUE BRUSH WITH GUARDS

Fig. 3116

Per inch diameter - - - - - - - - - - - - - - $1 00

These brushes are made from 10 inches up.

Fig. 3118

External

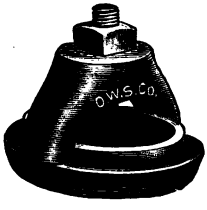
BOILER BRUSHES

Fig. 3120

Internal

For diam. boiler, in.	28	30	32	34	36	38	40	42	44	46	48	50	52
Fig. 3118 or 3120 -	$1 00	1 25	1 50	1 75	2 00	2 25	2 50	2 75	3 00	3 25	3 50	3 75	4 00

Fig. 3128



HAND HOLE PLATE

Size - - - - inches	$2\frac{3}{4}$x$3\frac{3}{4}$	3 x 4	$3\frac{1}{2}$ x $4\frac{1}{2}$	3 x 5	$3\frac{1}{2}$ x 5	4 x 5
Complete - - - - - -	$0 75	75	85	1 00	1 00	1 00
Bolts, only - - - - - -	25	25	25	25	25	25
Crow feet - - - - - -	25	25	25	30	30	30
Plate - - - - - - -	25	25	25	35	35	35
Gaskets - - - - - - -	10	10	10	12	12	12
Weight - - - - - lbs.	**6.5**	**6.5**	**7.5**	**9**	**9**	**10**

Fig. 3126

STAY BOLT BUSHINGS

(One Dozen.)

Per dozen - $4 25

The bushing is screwed in with a wrench and broken off; the hole in bushing is then tapped for stay bolt.

Fig. 3130

SOFT OR FUSIBLE PLUGS

Fig. 3133

Sizes - - - - - inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Short, fig. 3130 / Long, fig. 3133 - - - -	$0 60	75	1 00	1 50	2 00	3 00

Fig. 4750

WEIGHTED GAUGE COCK

REGESTER PATTERN

Sizes - - - - - - inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Price - - - - - - - -	$1 00	1 00	1 00
Weight - - - - - - lbs.	**2**	**2**	**2.3**

BOILER TOOLS AND ATTACHMENTS

STEAM GAUGE

WITH IRON OR BRASS CASE

BOURDON SINGLE SPRING

Including cock

Fig. 5339

Sizes	Iron case, brass ring	Iron case, n. p. ring	Brass case	Nickel plated case	Weight, lbs.
12 -inch dial	$50 00	51 50	75 00	79 00	24
10 -inch dial	32 00	33 00	40 00	43 00	13
8½-inch dial	22 00	22 75	30 00	32 50	9
6¾-inch dial	16 00	16 60	20 00	22 00	8
6 -inch dial	13 00	13 50	16 00	17 50	5
5½-inch dial	10 00	10 25	12 00	13 25	4.3
5 -inch dial	8 00	8 20	11 00	12 00	3.3
4½-inch dial	8 00	8 20	10 00	11 00	3
3½-inch dial	7 00	7 18	9 00	9 75	1.5
3 -inch dial	6 00	6 15	8 00	8 60	1

BOURDON DOUBLE SPRING

Sizes	Iron case, japanned	Iron case, n. p. ring	Brass case	Nickel plated case
12 -inch dial	$55 00	56 50	80 00	84 00
10 -inch dial	37 00	38 00	45 00	48 00
8½-inch dial	25 00	25 75	34 00	36 50
6¾-inch dial	18 00	18 60	22 00	24 00
6 -inch dial	15 00	15 50	18 00	19 50
5½-inch dial	12 00	12 25	14 00	15 25
5 -inch dial	11 00	11 20	13 00	14 00
4½-inch dial	10 00	10 20	12 00	13 00

Fig. 5337

SYPHON

FOR STEAM GAUGES

Price - $0 25

Weight, .5 pound

Fig. 4683

POP SAFETY VALVE—BRASS

Sizes - - - - - inches	¼	¾	1	1¼	1½	2
Price - - - - - -	$8 00	10 00	12 00	15 00	20 00	30 00
Weight - - - - - lbs.	- - - -	**2.5**	**3.5**	**4**	**5**	**8**

KUNKLE POP SAFETY VALVE—BRASS

Size - - - - - - inches	¾	1	1¼	1½	2	2½
Horse power - - - - -	2 to 5	5 to 10	10 to 15	15 to 20	20 to 35	35 to 60
With direct outlet - - -	$9 00	10 00	12 00	15 00	25 00	35 00
With side outlet - - - -	10 00	12 00	14 00	17 00	28 00	40 00

Size - - - - - - inches	3	3½	4	4½	5	6
Horse power - - - -	60 to 90	90 to 120	- - - -	- - - - -	- - - - -	- - - - -
With direct outlet - - -	$50 00	70 00	90 00	110 00	140 00	180 00
With side outlet - - -	56 00	78 00	100 00	125 00	160 00	200 00

BOILER TOOLS AND ATTACHMENTS

O. W. S. CO. PATENT POP SAFETY VALVE

Fig. 4624

Our boilers are fitted with the patent pop safety valve, which combines all the most desirable features for convenience and safety. Three-inch opening to boiler for passage of steam under great draft without syphoning; four standard two-inch openings for straight connections to a number of motors when desired.

As more than three engines are seldom run from one boiler, the fourth opening can be used for attaching a common I. B. lever safety valve, which can be gauged to blow off at a slightly greater pressure than the pop valve, thus adding an element of safety, as any pop valve may stick, while the lever valve may be frequently tested by merely raising the lever.

Weight, 18 lbs. - - - - - - - - - - - - - - - - - - Price, $20 00

IRON BODY POP SAFETY VALVE

Fig. 4623

SCREWED OR FLANGED ENDS

Sizes - - - - - - inches	2	2½	3	3½
Each - - - - - - - -	$30 00	50 00	65 00	80 00
With lock up - - - - - -	35 00	55 00	75 00	90 00
Weight - - - - - lbs.	**22.5**	- - -	**46**	- - -
Sizes - - - - - - inches	4	4½	5	6
Each - - - - - - - -	$100 00	115 00	125 00	180 00
With lock up - - - - - -	110 00	125 00	135 00	200 00
Weight - - - - - lbs.	- - - -	- - - -	- - - -	- - - -

STANDARD IRON BODY SAFETY VALVES

Fig. 4950

Cross, screwed

Fig. 4953

Angle, screwed

NOTE—3 inches and larger have iron top bolted on, 2½ inches and smaller have swivel top.

Sizes - - - - - - - - - inches	¾	1	1¼	1½	2	2½	3
Screwed, figs. 4950, - - - - - -	$3 50	4 00	5 00	5 80	7 80	13 25	17 25
Weight - - - - - - - - - lbs.	- - -	**13**	**16**	**19**	**29**	**68**	**99**
Sizes - - - - - - - - - inches	3½	4	4½	5	6	7	8
Screwed, figs. 4950, 4953 - - - - - -	$23 00	28 75	34 50	41 50	57 75	93 50	132 00
Weight - - - - - - - - - lbs.	- - -	**183**	**187**	- - -	**378**	- - -	- - -

BOILER TOOLS AND ATTACHMENTS

SINGLE BELL CHIME STEAM WHISTLES

ALL BRASS

Fig. 4790

Without valve

Fig. 4792

With adjustable lever

Fig. 4791

Locomotive type with upright valve

Diameter of bells - inches	1½	2	2½	3	3½	4	5	6	8	10
For pipe sizes - - inches	⅜	½	¾	¾	1	1¼	1½	1½	2	2½
Fig. 4790 - - - - - - - -	$5 50	8 50	10 50	13 50	18 50	24 00	37 00	49 00	120 00	188 00
Fig. 4792 - - - - - - - -	7 00	10 00	13 00	16 00	22 00	28 00	44 00	60 00	145 00	235 00
Weight - - - - - - lbs.	-----	----	-----	-----	-----	-----	----	----	-----	-----
Iron base, without valve - -	-----	-----	- -	12 00	16 50	22 00	33 00	45 00	108 00	155 00
Fig. 4791 - - - - - - - -	...	-----	-----	-- --	-----	27 50	43 00	59 00	-----	-----
Weight - - - - - lbs.	**2.5**	-----	-----	**6**	----	**10**	**17**	**27**	**53**	**96**

Fig. 4787

With valve

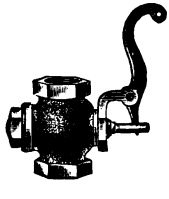
Fig. 4785

Without valve

BRASS STEAM WHISTLES

Diameter of bell - inches	1	1¼	1½	2	2½	3	3½	4	5	6	8
Size of connection inches	½	½	½	½	¾	1	1	1¼	1½	2	2½
With valves - - - - - -	$3 10	3 75	4 00	5 50	6 50	8 50	11 50	15 00	22 50	33 00	95 00
Weight - - - - - - lbs.	**.67**	**1.37**	**1.55**	**2.79**	**4.12**	**6.2**	**7.1**	**10**	**14**	**21**	-----
Without valves - - - - -	$2 20	2 75	3 00	4 35	5 25	7 25	9 50	12 00	19 00	24 00	70 00
Weight - - - - - - lbs	**.55**	**1**	**1.25**	**2.25**	**3.1**	**5.1**	**5.6**	**8.4**	**12.3**	**17.1**	-----

Fig. 4795



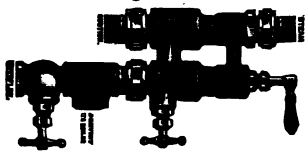
BRASS WHISTLE VALVE

Sizes - inches	½	¾	1	1¼	1½	2	2½	3
Price - - -	$2 50	3 00	3 50	5 00	6 00	9 00	18 00	27 00
Weight - lbs.	------	------	------	------	------	------	------	------

BOILER TOOLS AND ATTACHMENTS

HANCOCK INSPIRATOR AND PARTS

Fig. 5435



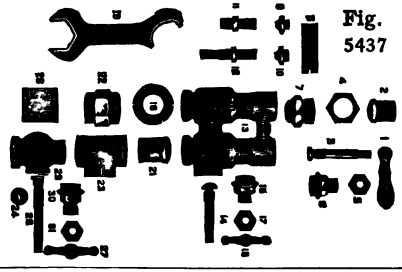


Fig. 5437

No.	Price	SIZE OF CONNECTION		Gallons per hour 60 lbs. pressure	Weight, lbs.
		Suction and feed	Steam		
7½	$16 00	⅜	⅜	60	5
8¾	18 00	½	⅜	90	6
10	20 00	½	⅜	120	6
12½	25 00	¾	½	220	8.5
15	30 00	¾	½	300	8.5
17½	40 00	1	¾	420	12
20	45 00	1	¾	540	12
22½	55 00	1¼	1	720	21
25	60 00	1¼	1	900	21
30	75 00	1½	1¼	1,260	28
35	90 00	1½	1¼	1,740	35
40	110 00	2	1½	2,230	40
45	125 00	2	1½	2,820	46
50	150 00	2½	2	3,480	65

HANCOCK INSPIRATOR PARTS. Fig. 5437

No.	Size of Inspirator	7½	8¾ and 10	12½ and 15	17½ and 20	22½ and 25	30 and 35	40 and 45	50 and 55
1	Handle for top bonnet	$0.75	.75	.90	1.05	1.40	1.90	2.40	2.90
2	Nipple for steam connection	.40	.40	.50	1 00	1.30	2.00	2.40	3.15
3	Stem for top bonnet	.90	.90	1.60	2.50	3.50	4.50	5.20	6.00
4	Coupling nut for steam connection	.70	.70	.85	1.20	1.75	2.40	3.00	4.25
5	Packing nut for top bonnet	.50	.50	.60	.70	.80	1.00	1.20	1.50
6	Jet wrench	.20	.20	.30	.40	.50	.80	1.15	1.95
7	Union	.95	.95	1.35	1.75	2.40	3.95	6.10	9.20
8	Top bonnet	.80	.80	1.40	2.00	2.60	3.40	4.40	5.60
9	Lifter steam jet	.60	.60	.75	.90	1.70	2.25	3.00	5.50
10	Forcer steam jet	.85	.85	1.00	1.25	1.80	2.30	3.75	7.40
11	Lifter tube	1.20	1.20	1.40	1.75	2.50	4.00	6.00	9.00
12	Forcer tube	1.50	1.50	2.00	2.50	3.50	5.00	7.50	12.00
14	Stem for overflow bonnet	.90	.90	1.60	2.30	3.00	4.50	5.20	5.90
14	B disk for part No. 14	.....	.....	.....	.....	.....	.....	2.30	3.15
15	Handle for overflow bonnet	.60	.60	.70	.80	.90	1.00	1.10	1.20
16	Overflow bonnet	.80	.80	1.40	2.00	2.60	3.30	4.10	4.70
17	Packing nut for overflow bonnet	.50	.50	.60	.70	.80	1.00	1.20	1.40
18	Coupling nuts for suction and delivery	.70	.85	1.20	1.75	2.40	3.00	4.25	5 50
19	Spanner wrench	.....	.....	.....	.80	.90	1.20	1.40	1.60
21	Nipple for suction and delivery	.40	.50	1.00	1.30	2.00	2.40	3.15	4.25
22	Malleable iron coupling for suction	.30	.40	.50	.60	.75	.....	.....	.....
23	Malleable iron tee for delivery	.30	.40	.50	.80	1.10	1.55	2.65	4.55
24	Swivel for overflow valve	.....	.....	.....	.....	.40	.75	1.20	3.25
26	Stem for overflow valve	.90	.90	1.60	2.50	3.50	4.50	5.20	6.00
27	Handle for overflow valve	.60	.60	.70	.80	90	1.00	1.10	1.20
28	Strainer for suction pipe	.40	.50	.70	1.00	2.50	3.00	.....	.....
29	Body for overflow valve	1.10	1.10	1.50	2.40	3.30	4.80	6.90	9.00
30	Bonnet for overflow valve	.90	.90	1.60	2.50	3 50	4 50	5.20	6.00
31	Packing nut for overflow valve	.50	.50	.60	.70	.80	1.00	1.20	1.50
32	Consists of parts 1, 3, 5, 8	2.95	2.95	4.50	6.25	8.30	10.80	13.20	16.00
33	Consists of parts 14, 15, 16, 17	2.80	2.80	4.30	5.80	7.30	9.90	14.20	17.25
34	Consists of parts 24, 26, 27, 29, 30, 31	4.00	4.00	6.00	8.90	12.40	16 55	20.80	26.95
35	Consists of parts 9. 10, 11, 12	4.15	4.15	5 15	6.40	9.50	13.55	20.25	33.90
36	Consists of parts 18, 21. 22	1.40	1 75	2.70	3 65	5 15	5.40	7 40	9.75
37	Consists of parts 18, 21, 23, 34	5.40	5.75	8.70	12.75	17.90	20.50	30.85	41.25

BOILER TOOLS AND ATTACHMENTS

METROPOLITAN AUTOMATIC INJECTOR

Fig. 5430

No.	Price	Net weight, lbs.	Size pipe connections, inches	Gal. per hour, 80 lbs. steam pressure, 2 foot lift	Horse power
2	$15 00	**2.8**	⅜	60	4 to 6
3	16 00	**2.8**	⅜	80	6 to 8
3½	18 00	**3.5**	½	120	8 to 15
4	20 00	**3.5**	½	165	15 to 20
5	25 00	**5.5**	¾	250	20 to 30
6	30 00	**5.5**	¾	350	30 to 45
7	40 00	**8.8**	1	500	45 to 65
8	45 00	**8.8**	1	600	65 to 80
9	55 00	**13.1**	1¼	800	80 to 100
10	60 00	**13.1**	1¼	1,000	100 to 130
11	75 00	**22.2**	1½	1,300	130 to 170
12	90 00	**22.2**	1½	1,750	170 to 230
13	110 00	**31.5**	2	2,300	230 to 300
14	125 00	**31.5**	2	2,850	300 to 375

METROPOLITAN AUTOMATIC INJECTOR PARTS

Adopted March 1, 1897

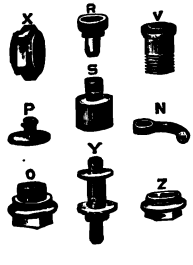
Size of injector, No.	2-3	3½—4	5—6	7—8	9—10	11—12	13—14
S Steam jet	$1 50	$1 75	$2 00	$2 50	$3 75	$5 00	$7 00
V Suction jet	60	70	90	1 25	1 85	3 00	4 00
C R D Combining and delivery tube and auxiliary check	1 75	2 10	2 75	3 50	4 50	6 50	9 00
P Overflow valve	25	50	75	1 00	1 25	1 75	2 50
O Steam plug	1 00	1 25	1 50	2 25	3 50	5 00	7 00
M Steam valve and stem	40	55	75	1 10	1 75	2 50	4 00
N Packing nut	30	40	50	65	80	1 00	1 25
K Steam valve handle	60	70	80	1 00	1 20	1 40	1 60
A Coupling nut	60	80	1 20	1 65	2 40	3 20	5 00
B Tail pipe	40	55	80	1 20	1 70	2 40	3 40
X Overflow cap	50	75	1 00	1 25	1 75	2 25	3 00
E Nut for steam M	10	10	10	15	15	15	20

PENBERTHY INJECTOR AND PARTS

Fig. 5422

Size No.	Price	Weight, lbs.	Gal. per hour, 65 lbs. pressure	Size of pipe connection	Horse power of boiler
OO	$16 00	**2.6**	60	⅜	4 to 8
A	18 00	**3.5**	85	½	8 to 16
AA	20 00	**3.5**	120	½	12 to 22
B	25 00	**5.5**	220	¾	17 to 32
BB	30 00	**5.5**	300	¾	20 to 45
C	40 00	**8 0**	430	1	40 to 65
CC	45 00	**8.0**	540	1	45 to 80
D	55 00	**11.5**	700	1¼	50 to 100
DD	60 00	**11.5**	900	1¼	75 to 135
E	75 00	**20.5**	1,260	1½	100 to 180
EE	90 00	**22.0**	1,740	1½	115 to 255
F	110 00	**32.0**	2,240	2	160 to 320
FF	125 00	**38.5**	2,870	2	200 to 400

Fig. 5423



PENBERTHY INJECTOR PARTS

Size of Injector	OO	A or AA	B or BB	C or CC	D or DD	E	EE	F	FF
R Steam jet	$0 25	$0 35	$0 45	$0 55	$0 65	$0 75	$0 75	$0 85	$1 00
S Suction	25	35	45	55	65	75	75	85	1 00
Y Delivery jet	1 25	1 50	2 00	2 50	3 00	3 75	4 50	5 50	6 50
X Coupling nut	25	30	40	50	60	1 25	1 25	1 50	1 50
V Tail pipe	25	30	40	50	60	80	80	1 00	1 00
Z Overflow cap	30	40	50	60	70	80	80	90	90
P Overflow valve	40	50	60	75	90	1 00	1 10	1 25	1 25
N Overflow hinge	10	10	15	15	15	20	20	20	20
O Plug	60	80	1 00	1 25	1 50	1 75	1 75	2 00	2 00
Strainer	40	40	50	50	60	75	75	1 00	1 00

Fig. 5424

BOILER TOOLS AND ATTACHMENTS

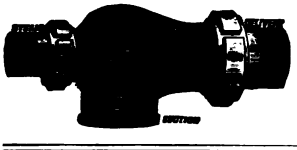
NATIONAL AUTOMATIC INJECTOR

No.	Price	SIZES OF PIPE CONNECTIONS			Gallons per hour at 60 lb. pressure	Horse power
		Steam	Supply	Delivery		
00	$16 00	⅜	⅜	⅜	60	1 to 5
0	18 00	⅜	⅜	⅜	90	5 to 10
1	20 00	½	½	½	120	10 to 15
2	25 00	½	¾	¾	220	15 to 24
3	30 00	½	¾	¾	300	24 to 35
4	40 00	¾	1	1	420	35 to 50
5	45 00	¾	1	1	540	50 to 65
6	55 00	1	1¼	1¼	720	65 to 90
7	60 00	1	1¼	1¼	900	90 to 115
8	75 00	1¼	1½	1½	1,200	115 to 150
9	90 00	1¼	1½	1½	1,700	150 to 200
10	110 00	1½	2	2	2,200	200 to 275
11	125 00	1½	2	2	2,800	275 to 350

NATIONAL AUTOMATIC INJECTOR PARTS

No. pts.	Size of Injector by No.	00	0	1	2	3	4	5	6	7	8	9	10	11
1	Delivery tube	$0 50	55	60	65	70	75	80	1 00	1 10	1 30	1 40	1 70	1 80
2	Combining tube	75	80	85	90	1 00	1 20	1 40	1 70	1 80	2 10	2 20	2 50	2 70
3	Lifting tube	50	55	60	65	70	75	80	1 00	1 10	1 30	1 40	1 70	1 80
4	Steam jet	50	55	60	65	70	75	80	1 00	1 10	1 30	1 40	1 70	1 80
5	Immediate cut-off	40	45	50	55	60	65	70	80	90	1 00	1 10	1 20	1 30
6	Overflow check	50	55	60	65	70	75	80	1 00	1 10	1 30	1 40	1 70	1 80
7	Overflow cap	50	55	60	65	70	75	80	1 00	1 10	1 30	1 40	1 70	1 80
8	Nut and tail piece for steam end	60	65	70	70	70	80	80	90	90	1 10	1 10	1 50	1 50
9	Nut and tail piece for discharge end	60	65	70	80	80	90	90	1 10	1 10	1 50	1 50	2 00	2 00
10	Nut and tail piece for water end	60	65	70	80	80	90	90	1 10	1 10	1 50	1 50	2 00	2 00

Fig. 5451



H. D. EJECTOR OR JET PUMP

Size	Price	Net weight, lbs.	PIPE CONNECTIONS		Capacity per hour, gallons	Strainers each
			Steam, inch	Suction and delivery, inch		
No. 1 brass	$8 00	1.2	⅜	½	250	$0 30
No. 2 brass	10 00	1.7	½	¾	500	40
No. 3 brass	15 00	2.7	¾	1	960	50
No. 4 brass	20 00	4.0	1	1¼	1,300	60
No. 5 brass	25 00	5.8	1¼	1½	2,000	80
No. 6 iron	35 00	9.7	1¼	2	4,000	1 00
No. 7 iron	45 00	- - -	1½	2½	8,000	1 25
No. 8 iron	55 00	22.6	2	3	11,000	1 75
No. 9 iron	70 00	39.5	2½	4	15,000	2 50

BOILER TOOLS AND ATTACHMENTS

Fig. 4780

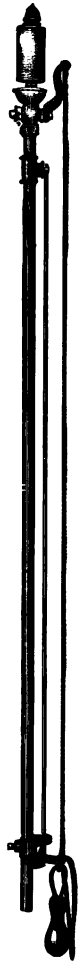


Fig. 4781

LOW WATER ALARMS

To be placed at second gauge cock in boiler.

When water is below that point steam enters and expands tube, which drops weight and blows the whistle.

Fig. 4780 (O. W. S. Co.) less whistle - - - - - - - - $2 50
Fig. 4781 (Evans) less whistle - - - - - - - - - - - 3 00

LUTHER LOW WATER SHUT-OFF

Not illustrated.

Size - - - - - - - - - - inches	1	1½	2
Price - - - - - - - - - - - -	$5 00	8 00	12 00

Fig. 4800

BLEEDERS FOR STEAM PIPES

ALSO CALLED DRAIN PLUGS

Fig. 4801

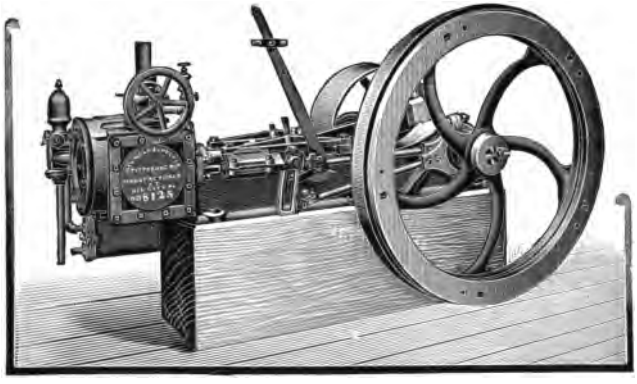
Sizes - - - - - - - inches	1	1¼	1½	2
Single thread, fig. 4800 - -	$0 90	1 00	1 10	1 25
Double thread, fig. 4801 - -	1 20	1 25	1 50	2 00

"LINK" ENGINE

DOUBLE ECCENTRIC

The highest grade and most efficient engine for well drilling

Fig. 1425



Slide valve. Reversed by a rod in the derrick.

TABLE OF DIMENSIONS AND POWER OF DRILLING ENGINES

Horse power	12	13½	15	18	20
Revolutions per minute	175	175	175	175	150
Diameter of cylinder - inches	8	8½	9	9½	10
Length of stroke - inches	12	12	12	12	12
Diameter of steam pipe - inches	2	2	2	2	2
Diameter of exhaust pipe - inches	4¼	4¼	4¼	4¼	4¼
Diameter of pulley - inches	30	30	30	30	30
Diameter of balance wheel - inches	50	50	56	56	60
Diameter of crank shaft - inches	3¼	3¼	3½	3½	3¾
Diameter of crank pin - inches	3¾	3¾	3¾	3¾	3¾
Diameter of cross head pin - inches	2¼	2¼	2¼	2¼	2¼
Width of engine block - inches	22	22	22	22	24
Length of engine block - inches	72	72	72	72	72
Weight, complete - lbs.	2800	2800	3300	3300	4000
Weight, complete - kilos.	1273	1273	1500	1500	1818
Complete engine	$285 00	290 00	295 00	305 00	320 00
Stripped engine	267 50	272 50	277 50	287 50	302 50

Horse power	23	25	28	30	70
Revolutions per minute	150	150	150	150	125
Diameter of cylinder - inches	10½	11	11½	12	16
Length of stroke - inches	12	12	12	12	16
Diameter of steam pipe - inches	2	2	2	2½	4
Diameter of exhaust pipe - inches	4¼	4¼	4¼	4¼	5⅜
Diameter of pulley - inches	30	26	26	26	- - - -
Diameter of balance wheel - inches	60	60	60	60	- - - -
Diameter of crank shaft - inches	3¼	4	4	4	5
Diameter of crank pin - inches	3¼	4	4	4	5
Diameter of cross head pin - inches	2¼	2¾	2¾	2¾	3½
Width of engine block - inches	24	24	24	24	28½
Length of engine block - inches	72	72	72	74	100
Weight, complete - lbs.	3900	4500	4600	4600	4700
Weight, complete - kilos.	1773	2045	2090	2090	2136
Complete engine	330 00	340 00	365 00	375 00	- - -
Stripped engine	312 50	317 50	342 50	352 50	- - - -

The above given weights of 16 x 16 engines are less pump, heater, and fly wheel.

The "complete" engine includes pulley, balance wheel, extra rims, throttle valve, lubricator, oil cups, pet cocks, foundation bolts, and wrenches, but does not include any connecting pipes between engine and boiler, these are subject to order and are charged extra.

The "stripped" engine includes fixtures same as above specified, except the pump, heater, and extra rims.

In ordering, specify whether a "complete" or "stripped" engine is wanted.

PARTS FOR "LINK" ENGINE

When ordering parts, state size and number of engine.

Fig. 3910

Fig. 3911

Fig. 3912

Fig. 3916

Fig. 3917

Fig. 3913

Fig. 3914

Fig. 3915

Fig. 3918

Fig. 3921

Fig. 4089

Fig. 3920

Fig. 3923

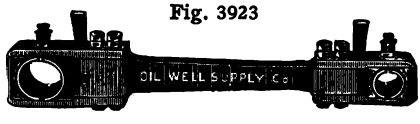


Fig. 3924

Fig. 3925

Fig. 3926

Fig. 3927

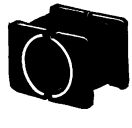


Fig. 3928

Fig. 3929

Fig. 3930

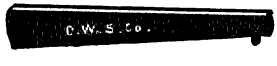


Fig. 3931

Fig. 3940

Fig. 3932

Fig. 3933

Fig. 3934

Fig. 3935

PARTS FOR "LINK" ENGINE

When ordering parts, state size and number of engine

Fig. 3943

Fig. 3944

Fig. 3945

Fig. 3946

Fig. 3947

Fig. 3948

Fig. 3949

Fig. 3950

Fig. 3951

Fig. 3952

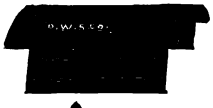


Fig. 3953

Fig. 3955

Fig. 3958

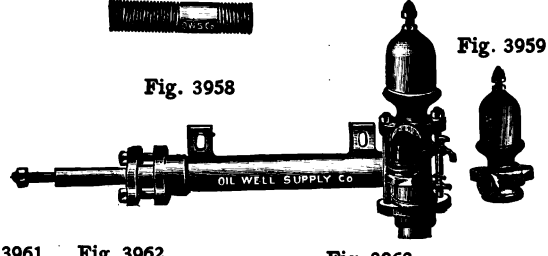


Fig. 3959

Fig. 3960

Fig. 3961

Fig. 3962

Fig. 3963

Fig. 3964

Fig. 3965

Fig. 3966

Fig. 3967

Fig. 3968

Fig. 3969

Fig. 3970

Fig. 3974

Fig. 3973

Fig. 3977

Fig. 3980

Fig. 3981

Fig. 3982

Fig. 3987

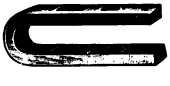


Fig. 3983

Fig. 3991

Fig. 3988

Fig. 3989

Fig. 3986

Fig. 3984

Fig. 3990

PARTS FOR "LINK" ENGINE

When ordering parts, state size and number of engine

Fig. 3995

Fig. 3996

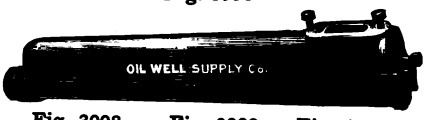


Fig. 3997

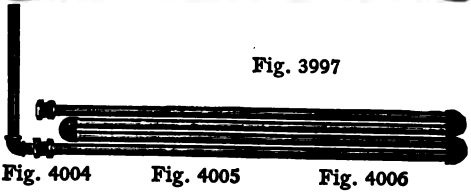


Fig. 3998

Fig. 3999

Fig. 4000

Fig. 4001

Fig. 4002

Fig.4003

Fig. 4004

Fig. 4005

Fig. 4006

Fig. 4009

Fig. 4010

Fig. 4011

Fig. 4012

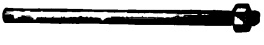


Fig. 4013

Fig. 4014

Fig. 4015

Fig. 4018

Fig. 4019

Fig. 4020

Fig. 4023

Fig. 4024

Fig. 4025

Fig. 4033

Fig. 4036

Fig. 4030

Fig. 4034

Fig. 4040

Fig. 4035

Fig. 4039

Fig. 4042

Fig. 4050

Fig.4041

Fig. 4043

Fig. 4044

Fig.4045

Fig. 4046

Fig. 4051

Fig. 4052

PARTS FOR "LINK" ENGINE

When ordering parts, state size and number of engine

Fig. 4057

Fig. 4058

Fig. 4059

Fig. 4060

Fig. 4061

Fig. 4062

Fig. 4063

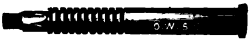


Fig. 4064

Fig. 4065

Fig. 4066

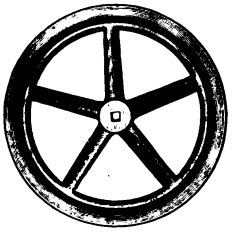


Fig. 4067

Fig. 4068

Fig. 4069

Fig. 4070

Fig. 4075

PARTS FOR "LINK" ENGINE—LIST

Figure No.	PARTS	SIZES OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
3910	Bed plate with piston gland and guide studs	$51 25	51 25	51 25	51 25	65 50	65 50	71 00	71 00	71 00
3911	Journal caps, fly wheel side	1 50	1 50	1 50	1 50	2 00	2 00	2 25	2 25	2 25
3912	Journal caps, pulley side	1 75	1 75	1 75	1 75	2 25	2 25	2 50	2 50	2 50
3913	Bed plate bolt and nuts	30	30	30	30	30	30	30	30	30
3914	Babbitt shell, fly wheel side, top	1 75	1 75	1 75	1 75	2 15	2 15	2 25	2 25	2 25
3915	Babbitt shell, fly wheel side, bottom	1 75	1 75	1 75	1 75	2 15	2 15	2 25	2 25	2 25
3916	Babbitt shell, pulley side, top	2 00	2 00	2 00	2 00	2 50	2 50	3 00	3 00	3 00
3917	Babbitt shell, pulley side, bottom	2 00	2 00	2 00	2 00	2 50	2 50	3 00	3 00	3 00
3918	Cap stud and nuts	20	20	20	20	20	20	20	20	20
3919	Combination fly wheels	43 25	43 25	58 75	58 75	65 00	65 00	65 00	65 00	65 00
4089	Rimmed fly wheel, complete	37 50	37 50	51 00	51 00	58 00	58 00	62 00	62 00	62 00
----	Rimmed fly wheel hub part only	19 00	19 00	23 00	23 00	25 00	25 00	28 00	28 00	28 00
----	Rimmed fly wheel heavy rim only	11 50	11 50	17 00	17 00	19 00	19 00	19 00	19 00	19 00
----	Rimmed fly wheel light rim only	6 00	6 00	9 75	9 75	13 00	13 00	13 00	13 00	13 00
3920	Rimmed fly wheel key and nut	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3921	Rimmed fly wheel bolts, per set	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3923	Connecting rod, complete	38 25	38 25	38 25	38 25	38 25	38 25	41 75	41 75	41 75
3924	Connecting rod strap, crank end	6 75	6 75	6 75	6 75	6 75	6 75	7 25	7 25	7 25
3925	Connecting rod strap, cross head end	5 75	5 75	5 75	5 75	5 75	5 75	6 25	6 25	6 25
3926	Connecting rod brasses, crank end	7 50	7 50	7 50	7 50	7 50	7 50	9 00	9 00	9 00
3927	Connecting rod brasses, cross head end	4 50	4 50	4 50	4 50	4 50	4 50	5 25	5 25	5 25
3928	Connecting rod block, crank end	90	90	90	90	90	90	90	90	90
3929	Connecting rod block, cross head end	65	65	65	65	65	65	65	65	65
3930	Connecting rod key, crank end	65	65	65	65	65	65	65	65	65
3931	Connecting rod key, cross head end	50	50	50	50	50	50	50	50	50
3932	Connecting rod set screw	10	10	10	10	10	10	10	10	10
3933	Connecting rod strap bolt, crank end	65	65	65	65	65	65	65	65	65
3934	Connecting rod strap bolt, cross head end	50	50	50	50	50	50	50	50	50
3935	Connecting rod, stripped	10 00	10 00	10 00	10 00	10 00	10 00	10 00	10 00	10 00

PARTS FOR "LINK" ENGINE—LIST

When ordering parts state size and number of engine

Figure No.	PARTS	SIZES OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
3940	Oil cup	$0 35	35	35	35	35	35	35	35	35
3943	Cylinders with studs	31 75	31 75	31 75	32 50	41 50	42 50	43 50	43 50	45 50
3944	Cylinder heads	2 75	2 75	2 75	3 00	4 00	4 25	4 25	4 25	4 25
3945	Steam chest cover	3 00	3 00	3 00	3 00	3 50	3 50	4 50	4 50	4 50
3946	Steam chest cover, stud, and nut	20	20	20	20	20	20	20	20	20
3947	Slide valve	2 25	2 25	2 25	2 25	2 75	2 75	3 25	3 25	3 25
3948	Cylinder stud, head end	15	15	15	15	20	20	20	20	20
3949	Cylinder cock	50	50	50	50	50	50	50	50	50
3950	Cylinder stud, short, bed end	15	15	15	15	15	15	15	15	15
3951	Cylinder stud, long, bed end	20	20	20	20	20	20	20	20	20
3952	Cylinder jacket	1 50	1 50	1 50	1 75	1 75	1 75	1 75	1 75	1 75
3953	Cylinder jacket cap bolt	10	10	10	10	10	10	10	10	10
3955	Cross head	5 00	5 00	5 00	5 00	6 25	6 25	7 75	7 75	7 75
3958	Pump, complete	14 50	14 50	14 50	14 50	14 50	14 50	14 50	14 50	14 50
3959	Pump air chamber	2 50	2 50	2 50	2 50	2 50	2 50	2 50	2 50	2 50
3960	Pump barrel	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00
3961	Pump valve, bottom	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3962	Pump valve, top	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3963	Pump plunger and nut	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3964	Pump base	65	65	65	65	65	65	65	65	65
3965	Pump gland	50	50	50	50	50	50	50	50	50
3966	Pump gland stud and nut	20	20	20	20	20	20	20	20	20
3967	Pump con'ting bolt and nut	10	10	10	10	10	10	10	10	10
3968	Pump union elbow	65	65	65	65	65	65	65	65	65
3969	Air cock	30	30	30	30	30	30	30	30	30
3970	Bib nozzle air cock	45	45	45	45	45	45	45	45	45
3973	Pulley	17 75	17 75	17 75	17 75	23 00	23 00	23 00	23 00	23 00
3974	Pulley key and nut	90	90	90	90	90	90	90	90	90
3977	Exhaust flange, stripped	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3980	Eccentric hub and set screw	3 25	3 25	3 25	3 25	4 00	4 00	4 00	4 00	4 00
3981	Eccentric hub set screw	10	10	10	10	10	10	10	10	10
3982	Eccentric strap, complete	2 75	2 75	3 00	3 00	3 00	3 00	3 00	3 00	3 00
3983	Eccentric strap bolt	40	40	40	40	40	40	40	40	40
	Eccentric rod, complete	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00	5 00
3986	Eccentric rod set screw	10	10	10	10	10	10	10	10	10
3987	Eccentric rod strap	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25
3988	Eccentric rod strap bolt	10	10	10	10	10	10	10	10	10
3989	Eccentric rod key	40	40	40	40	40	40	40	40	40
3990	Eccentric key	40	40	40	40	40	40	40	40	40
3991	Valve rod slide pin bolt	10	10	10	10	10	10	10	10	10
3995	Heater, complete	21 00	21 00	21 00	21 00	21 00	21 00	21 00	21 00	21 00
3996	Heater case	11 75	11 75	11 75	11 75	11 75	11 75	11 75	11 75	11 75
3997	Heater pipes	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25
3998	Heater elbow	80	80	80	80	1 10	1 10	1 10	1 10	1 10
3999	Heater goose neck	2 75	2 75	2 75	2 75	2 75	2 75	2 75	2 75	2 75
4000	Heater head	65	65	65	65	65	65	65	65	65
4001	Heater union nipple	25	25	25	25	25	25	25	25	25
4002	Heater nipple	10	10	10	10	10	10	10	10	10

PARTS FOR "LINK" ENGINE—LIST

When ordering parts, state size and number of engine

Figure No.	PARTS	SIZES OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
4003	Heater bolt	$0 10	10	10	10	10	10	10	10	10
4004	Heater lock-nut	10	10	10	10	10	10	10	10	10
4005	Heater collar	30	30	30	30	30	30	30	30	30
4006	Heater return bend	25	25	25	25	25	25	25	25	25
4009	Piston, complete	6 50	6 75	7 00	7 25	8 25	8 75	9 75	10 00	11 00
4010	Piston head	3 75	4 00	4 50	4 50	5 25	5 75	6 00	6 50	8 25
4011	Piston ring (two in a set)	1 00	1 00	1 00	1 00	1 15	1 15	1 25	1 25	1 25
4012	Piston rod and nut	2 75	2 75	2 75	2 75	3 00	3 00	3 75	3 75	3 75
4013	Piston nut	50	50	50	50	50	50	50	50	50
4014	Piston gland	50	50	50	50	50	50	50	50	50
4015	Piston gland stud and nut	15	15	15	15	15	15	15	15	15
4018	Reverse lever, complete	4 50	4 50	4 50	4 50	4 50	4 50	4 50	4 50	4 50
4019	Reverse lever yoke	50	50	50	50	50	50	50	50	50
4020	Reverse lever fulcrum pin	60	60	60	60	60	60	60	60	60
4023	Link complete	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00
4024	Link ear pin and nut	50	50	50	50	50	50	50	50	50
4025	Link hanger bolt and nut	50	50	50	50	50	50	50	50	50
4030	Exhaust pipe	2 80	2 80	2 80	2 80	2 80	2 80	2 80	2 80	2 80
4033	Shaft	30 50	30 50	33 00	33 00	36 25	36 25	44 00	44 00	44 00
4034	Guide	1 25	1 25	1 25	1 25	2 00	2 00	2 25	2 25	2 25
4035	Guide stud	20	20	20	20	20	20	20	20	20
4036	Guide block	15	15	15	15	15	15	15	15	15
4039	Valve rod and slide, complete	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00
4040	Valve rod slide	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
4041	Valve rod collar	50	50	50	50	50	50	50	50	50
4042	Valve rod gland	50	50	50	50	50	50	50	50	50
4043	Valve rod and nut	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
4044	Valve rod gland stud and nut	10	10	10	10	10	10	10	10	10
4045	Valve rod slide pin	50	50	50	50	50	50	50	50	50
4046	Slide bracket	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
4050	Lubricator	60	60	60	60	60	60	60	60	60
4051	Lubricator elbow	05	05	05	05	05	05	05	05	05
4052	Lubricator nipple	10	10	10	10	10	10	10	10	10
4057	Throttle valve, complete	9 50	9 50	9 50	9 50	10 00	10 00	10 75	10 75	10 75
4058	Throttle valve body	3 00	3 00	3 00	3 00	3 50	3 50	3 75	3 75	3 75
4059	Throttle valve yoke	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
4060	Throttle valve yoke nut (brass)	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
4061	Throttle valve yoke stud and nut	10	10	10	10	10	10	10	10	10
4062	Throttle valve nut	10	10	10	10	10	10	10	10	10
4063	Throttle valve stem	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
4064	Throttle valve clapper	65	65	65	65	65	65	65	65	65
4065	Throttle valve seat	75	75	75	75	75	75	75	75	75
4066	Throttle valve wheel	50	50	50	50	50	50	50	50	50
4067	Throttle valve set screw	10	10	10	10	10	10	10	10	10
4068	Throttle valve stem gland	35	35	35	35	35	35	35	35	35
4069	Throttle valve stem gland stud and nut	10	10	10	10	10	10	10	10	10
4070	Throttle valve and steam chest stud	10	10	10	10	10	10	10	10	10
4075	Malleable iron wrench	25	25	25	25	25	25	25	25	25

PARTS OF SINGLE ECCENTRIC ENGINE

WOOLF'S PATENT

When ordering parts, state size and number of engine

Fig. 3745

Fig. 3747

Fig. 3748

Fig. 3750

Fig. 3751

Fig. 3752

Fig. 3753

Fig. 3749

Fig. 3759

Fig. 3758

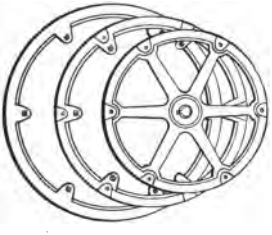


Fig. 3757

Fig. 3754

Fig. 3760

Fig. 3761

Fig. 3762

Fig. 3763

Fig. 3764

Fig. 3765

Fig. 3766

Fig. 3767

Fig. 3768

Fig. 3771

Fig. 3772

Fig. 3769

Fig. 3770

Fig. 3774

PARTS OF SINGLE ECCENTRIC ENGINE

When ordering parts, state size and number of engine

Fig. 3778

Fig. 3776

Fig. 3777

Fig. 3779

Fig. 3780

Fig. 3881

Fig. 3783

Fig. 3784

Fig. 3782

Fig. 3787

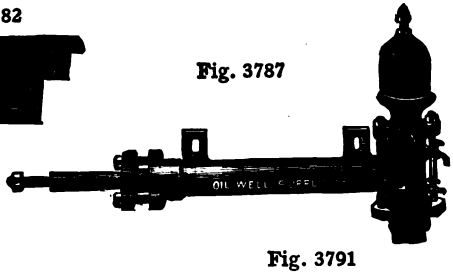


Fig. 3789

Fig. 3788

Fig. 3790

Fig. 3791

Fig. 3792

Fig. 3793

Fig. 3798

Fig. 3796

Fig. 3794

Fig. 3795

Fig. 3797

Fig. 3803

Fig. 3799

Fig. 3800

Fig. 3804

Fig. 3805

Fig. 3806

Fig. 3807

Fig. 3808

Fig. 3812

Fig. 3814

Fig. 3810

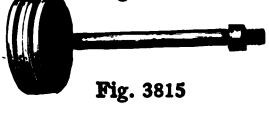


Fig. 3811

Fig. 3813

Fig. 3816

Fig. 3815

PARTS OF SINGLE ECCENTRIC ENGINE

When ordering parts, state size and number of engine

Fig. 3819

Fig. 3820

Fig. 3822

Fig. 3824

Fig. 3826

Fig. 3827

Fig. 3829

Fig. 3830

Fig. 3828

Fig. 3837

Fig. 3835

Fig. 3832

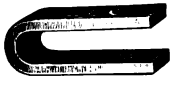


Fig. 3833

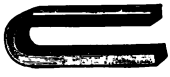


Fig. 3831

Fig. 3838

Fig. 3839

Fig. 3834

Fig. 3841

Fig. 3836

Fig. 3843

Fig. 3844

Fig. 3846

Fig. 3847

Fig. 3845

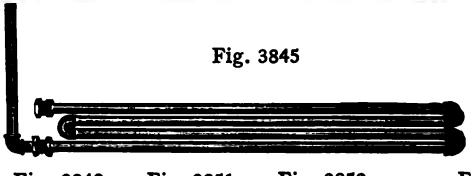


Fig. 3848

Fig. 3849

Fig. 3851

Fig. 3852

Fig. 3853

Fig. 3854

Fig. 3855

Fig. 3856

Fig. 3860

Fig. 3861

Fig. 3862

Fig. 3858

Fig. 3864

Fig. 3865

Fig. 3863

PARTS OF SINGLE ECCENTRIC ENGINE

When ordering parts, state size and number of engine

Fig. 3866

Fig. 3867

Fig. 3868

Fig. 3870

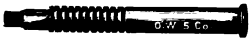


Fig. 3869

Fig. 3874

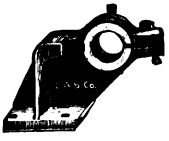


Fig. 3873

Fig. 3875

Fig. 3876

Fig. 3877

Fig. 3878

Fig. 3879

Fig. 3880

Fig. 3881

Fig. 3882

Fig. 3884

Fig. 3886

Fig. 3887

Fig. 3888

Fig. 3893

Fig. 3890

Fig. 3891

Fig. 3894

Fig. 3895

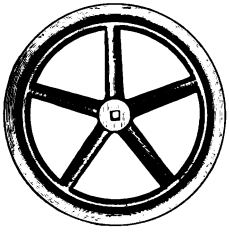


Fig. 3896

Fig. 3898

Fig. 3897

Fig. 3900

For price of all sizes of pulleys, see p.102

Fig. 3901

Fig. 3903

Fig. 3905

PARTS OF SINGLE ECCENTRIC ENGINE

WOOLF'S PATENT

When ordering parts, state size and number of engine

LIST

Figure No.	PARTS	SIZES OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
3745	Bed plate with piston gland and guide studs	$51 25	51 25	51 25	51 25	65 50	65 50	71 00	71 00	71 00
3747	Journal cap, fly wheel side, short	1 50	1 50	1 50	1 50	2 00	2 00	2 25	2 25	2 25
3748	Journal cap, pulley side, long	1 75	1 75	1 75	1 75	2 25	2 25	2 50	2 50	2 50
3749	Bed plate bolt and nuts	30	30	30	30	30	30	30	30	30
3750	Babbitt shell, fly wheel side, top	1 75	1 75	1 75	1 75	2 15	2 15	2 25	2 25	2 25
3751	Babbitt shell, fly wheel side, bottom	1 75	1 75	1 75	1 75	2 15	2 15	2 25	2 25	2 25
3752	Babbitt shell, pulley side, top	2 00	2 00	2 00	2 00	2 50	2 50	3 00	3 00	3 00
3753	Babbitt shell, pulley side, bottom	2 00	2 00	2 00	2 00	2 50	2 50	3 00	3 00	3 00
3754	Cap studs	20	20	20	20	20	20	20	20	20
3757	Fly wheel key and nut	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3758	Combination fly wheel	43 25	43 25	58 75	58 75	65 00	65 00	65 00	65 00	65 00
3759	Fly wheel bolt and nuts	10	10	10	10	10	10	10	10	10
3760	Connecting rod complete	38 25	38 25	38 25	38 25	38 25	38 25	41 75	41 75	41 75
3761	Con. rod strap, crank end	6 75	6 75	6 75	6 75	6 75	6 75	7 25	7 25	7 25
3762	Connecting rod strap, cross head end	5 75	5 75	5 75	5 75	5 75	5 75	6 25	6 25	6 25
3763	Con. rod brass, crank end	7 50	7 50	7 50	7 50	7 50	7 50	9 00	9 00	9 00
3764	Con. rod brass, cross head end	4 50	4 50	4 50	4 50	4 50	4 50	5 25	5 25	5 25
3765	Con. rod block, crank end	90	90	90	90	90	90	90	90	90
3766	Con. rod block, cross head end	65	65	65	65	65	65	65	65	65
3767	Con. rod key, crank end	65	65	65	65	65	65	65	65	65
3768	Con. rod key, cross head end	50	50	50	50	50	50	50	50	50
3769	Connecting rod strap bolt, crank end	65	65	65	65	65	65	65	65	65
3770	Connecting rod strap bolt, cross head end	50	50	50	50	50	50	50	50	50
3771	Connecting rod, stripped	10 00	10 00	10 00	10 00	10 00	10 00	10 00	10 00	10 00
3772	Connecting rod set screw	10	10	10	10	10	10	10	10	10
3774	Oil cup	35	35	35	35	35	35	35	35	35
3776	Cylinder head	2 75	2 75	2 75	3 00	4 00	4 25	4 25	4 25	4 25
3777	Steam chest stud and nut	15	15	15	15	15	15	15	15	15
3778	Cylinder with studs	31 75	31 75	31 75	32 50	41 50	42 50	43 50	43 50	45 50
3779	Steam chest cover	3 00	3 00	3 00	3 00	3 50	3 50	4 50	4 50	4 50
3780	Cylinder stud, head end	15	15	15	15	20	20	20	20	20
3781	Cylinder stud, bed end	20	20	20	20	20	20	20	20	20
3782	Cylinder jacket	1 50	1 50	1 50	1 75	1 75	1 75	1 75	1 75	75
3783	Cylinder jacket cap screw	10	10	10	10	10	10	10	10	10
3784	Cylinder cock	50	50	50	50	50	50	50	50	50
3787	Pump, complete	14 50	14 50	14 50	14 50	14 50	14 50	14 50	14 50	14 50
3788	Pump air chamber	2 50	2 50	2 50	2 50	2 50	2 50	2 50	2 50	2 50
3789	Pump barrel	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00
3790	Pump barrel stud	10	10	10	10	10	10	10	10	10
3791	Air cock	30	30	30	30	30	30	30	30	30

PARTS OF SINGLE ECCENTRIC ENGINE

WOOLF'S PATENT

When ordering parts, state size and number of engine

LIST

Figure No.	PARTS	SIZES OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
3792	Air cock, bib nozzle	$0 45	45	45	45	45	45	45	45	45
3793	Pump gland	50	50	50	50	50	50	50	50	50
3794	Pump valve and seat, bottom	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3795	Pump valve and seat, top	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3796	Pump connect. bolt and nut	10	10	10	10	10	10	10	10	10
3797	Pump base	65	65	65	65	65	65	65	65	65
3798	Pump gland stud and nut	20	20	20	20	20	20	20	20	20
3799	Pump union elbow	65	65	65	65	65	65	65	65	65
3800	Pump plunger and nut	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3803	Heater collar	25	25	25	25	25	25	25	25	25
3804	Heater stud	15	15	15	15	15	15	15	15	15
3805	Heater lock nut	15	15	15	15	15	15	15	15	15
3806	Heater union nipple	25	25	25	25	25	25	25	25	25
3807	Heater return bend	25	25	25	25	25	25	25	25	25
3808	Heater nipple	10	10	10	10	10	10	10	10	10
3810	Piston head and rod	6 50	6 75	7 00	7 25	8 25	8 75	9 75	10 00	11 00
3811	Piston ring (two in a set)	1 00	1 00	1 00	1 00	1 15	1 15	1 25	1 25	1 25
3812	Piston gland	50	50	50	50	65	65	65	65	65
3813	Piston gland stud and nut	15	15	15	15	15	15	15	15	15
3814	Piston head	3 75	4 00	4 50	4 50	5 25	5 75	6 00	6 50	8 25
3815	Piston rod and nut	2 75	2 75	2 75	2 75	3 00	3 00	3 75	3 75	3 75
3816	Piston nut	50	50	50	50	50	50	50	50	50
3819	Eccentric strap	6 50	6 50	6 50	6 50	6 75	6 75	6 75	6 75	6 75
3820	Eccentric hub and set screw	3 25	3 25	3 25	3 25	4 00	4 00	4 00	4 00	4 00
3822	Exhaust flange, stripped	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3824	Cross head	5 00	5 00	5 00	5 00	6 25	6 25	7 75	7 75	7 75
3826	Eccentric strap bolt	40	40	40	40	40	40	40	40	40
3828	Eccentric key	35	35	35	35	35	35	35	35	35
3829	Eccentric strap pin	65	65	65	65	65	65	65	65	65
3830	Eccentric strap set screw	10	10	10	10	10	10	10	10	10
3831	Eccentric rod strap bolt	40	40	40	40	40	40	40	40	40
3832	Eccentric rod strap, ecc. end	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25	1 25
3833	Eccentric rod strap, valve end	1 15	1 15	1 15	1 15	1 15	1 15	1 15	1 15	1 15
3834	Eccentric rod, complete	8 00	8 00	8 00	8 00	8 00	8 00	8 00	8 00	8 00
3835	Eccentric rod brass	40	40	40	40	40	40	40	40	40
3836	Eccentric rod, stripped	----	----	----	----	----	----	----	----	----
3837	Eccentric rod key	40	40	40	40	40	40	40	40	40
3838	Eccentric rod set screw, ecc. end	10	10	10	10	10	10	10	10	10
3839	Eccentric rod set screw, valve end	10	10	10	10	10	10	10	10	10
3841	Valve rod head pin bolt and revers. rol. pin bolt	10	10	10	10	10	10	10	10	10
3843	Heater, complete	21 00	21 00	21 00	21 00	21 00	21 00	21 00	21 00	21 00
3844	Heater case	11 75	11 75	11 75	11 75	11 75	11 75	11 75	11 75	11 75
3845	Heater pipes, complete	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25	3 25
3846	Heater elbow	80	80	80	80	1 10	1 10	1 10	1 10	1 10
3847	Heater goose neck	2 75	2 75	2 75	2 75	2 75	2 75	2 75	2 75	2 75
3848	Heater head	65	65	65	65	65	65	65	65	65

PARTS OF SINGLE ECCENTRIC ENGINE

WOOLF'S PATENT

When ordering parts, state size and number of engine

LIST

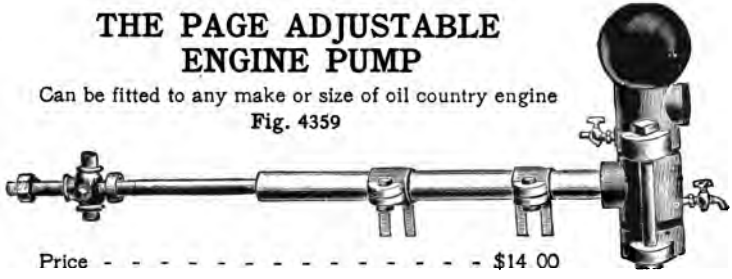
Figure No.	PARTS	SIZE OF ENGINES								
		8 x 12	8½ x 12	9 x 12	9½ x 12	10 x 12	10½ x 12	11 x 12	11½ x 12	12 x 12
3849	Heater bolt	$0 10	10	10	10	10	10	10	10	10
3851	Valve rod collar	50	50	50	50	50	50	50	50	50
3852	Valve rod gland	50	50	50	50	50	50	50	50	50
3853	Valve rod gland stud and nut	10	10	10	10	10	10	10	10	10
3854	Valve rod slide	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00	4 00
3855	Valve rod slide pin	50	50	50	50	50	50	50	50	50
3856	Slide bracket	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
3858	Slide valve	2 25	2 25	2 25	2 25	2 75	2 75	3 25	3 25	3 25
3860	Throttle valve, complete	9 50	9 50	9 50	9 50	10 00	10 00	10 75	10 75	10 75
3861	Throttle valve yoke	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3862	Throttle valve set screw	10	10	10	10	10	10	10	10	10
3863	Throttle valve yoke stud and nut	10	10	10	10	10	10	10	10	10
3864	Throttle valve yoke nut (brass)	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3865	Throttle valve nut	10	10	10	10	10	10	10	10	10
3866	Throttle valve body	3 00	3 00	3 00	3 00	3 50	3 50	3 75	3 75	3 75
3867	Throttle valve clapper	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75	1 75
3868	Valve and steam chest stud	15	15	15	15	15	15	15	15	15
3869	Valve seat	75	75	75	75	75	75	75	75	75
3870	Throttle valve stem	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3873	Reverse lever and head	5 50	5 50	5 50	5 50	6 00	6 00	6 00	6 00	6 00
3874	Reverse bracket	6 25	6 25	6 25	6 25	6 75	6 75	6 75	6 75	6 75
3875	Reverse roller	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00
3876	Reverse roller pin	50	50	50	50	50	50	50	50	50
3877	Reverse head stud and nut	15	15	15	15	15	15	15	15	15
3878	Reverse bracket tension stud and nut	20	20	20	20	20	20	20	20	20
3879	Reverse bracket set screw	10	10	10	10	10	10	10	10	10
3880	Reverse bracket adjust'g screw	10	10	10	10	10	10	10	10	10
3881	Reverse bracket stud	20	20	20	20	20	20	20	20	20
3882	Reverse lever yoke	50	50	50	50	50	50	50	50	50
3884	Shaft	30 50	30 50	33 00	33 00	36 25	3625	44 00	44 00	44 00
3886	Guide	1 25	1 25	1 25	1 25	2 00	2 00	2 25	2 25	2 25
3887	Guide block	15	15	15	15	15	15	15	15	15
3888	Guide stud, long	20	20	20	20	20	20	20	20	20
3890	Valve rod and slide, complete	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00
3891	Valve rod and nut	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
3893	Throttle valve stem gland	25	25	25	25	25	25	25	25	25
3894	Throttle valve stem gland stud and nut	10	10	10	10	10	10	10	10	10
3895	Throttle valve wheel	50	50	50	50	50	50	50	50	50
3896	Lubricator	60	60	60	60	60	60	60	60	60
3897	Lubricator elbow	05	05	05	05	05	05	05	05	05
3898	Lubricator nipple	10	10	10	10	10	10	10	10	10
3900	Pulley	17 75	17 75	17 75	17 75	23 00	23 00	23 00	23 00	23 00
3901	Pulley key and nut	90	90	90	90	90	90	90	90	90
3903	Malleable iron wrench	25	25	25	25	25	25	25	25	25
3905	Exhaust pipe	2 80	2 80	2 80	2 80	2 80	2 80	2 80	2 80	2 80

UNIV. OF CALIFORNIA

THE PAGE ADJUSTABLE ENGINE PUMP

Can be fitted to any make or size of oil country engine

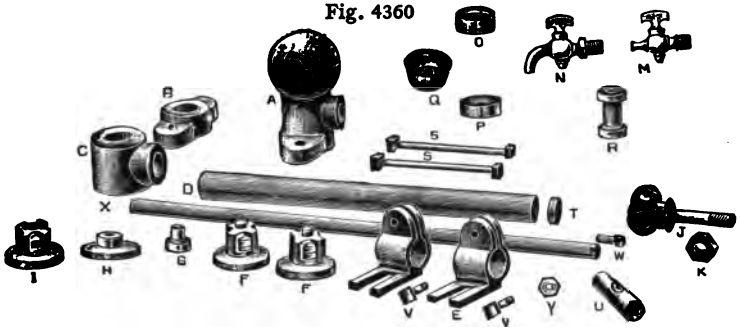
Fig. 4359



Price - - - - - - - - - - - - - - - - $14 00

PARTS

Fig. 4360



A	Air chamber - - - - - - - -	$2 00	O	Screw ring for plunger - - -	$0 40
B	Bottom - - - - - - - - - -	2 00	P	Shoulder ring for plunger - -	30
C	Center - - - - - - - - - -	2 00	Q	Cups, per set of two - - - -	20
D	Barrel (brass) - - - - - - -	2 00	R	Sleeve for plunger - - - - -	40
E	Clamps, per set of two - - -	2 00	S	Pump bolts - - - - - - - -	10
F	Valves, per set of two - - - -	3 50	T	Cup gauge - - - - - - - - -	10
G	Valve only - - - - - - - -	50	U	Pin for adjustable head - - -	25
H	Valve seat only - - - - - - -	75	V	Clamp bolts - - - - - - - -	5
I	Valve crown only - - - - - -	75	W	Screw for head - - - - - - -	5
J	Adjustable plunger head - - -	75	X	Plunger rod - - - - - - - -	60
K	Nut, crosshead end - - - - -	20	Y	Nut, cup end - - - - - - - -	15
M, N	Air cocks - - - - - - - -	25			

Fig. 3900

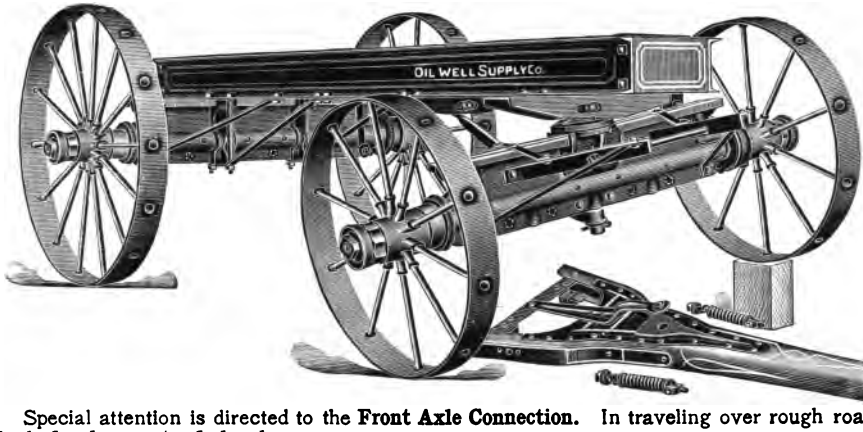
ENGINE PULLEYS

Diam., inches	Face	Weight, lbs.	Price	Diam. inches	Face	Weight, lbs.		Price
18	10	180	$12 50	30	10	260	------	$18 50
18	12	190	13 25	30	12	330	------	22 50
20	10	190	13 25	30	14	380	------	25 00
20	12	215	14 50	32	10	350	------	23 50
21	10	215	14 50	32	12	345	------	24 00
21	12	232	15 50	32	15	382	------	25 00
22	12	240	16 50	36	12	495	-----	33 00
24	12	250	17 00	40	12	540	------	36 50
26	12	320	22 00	48	12	695	------	46 00
27	12	260	17 75	60	12	930	Light	61 00
28	12	300	18 50	60	12	1,270	Heavy	79 50

TRUCK FOR STEAM OR GAS ENGINE

CONSTRUCTED ENTIRELY OF STEEL AND IRON

Fig. 1446



Special attention is directed to the **Front Axle Connection.** In traveling over rough roads the **body always stands level.**

Prices on application

GROOVED WHEELS

Fig. 2271

Drilled

No. 1, drilled, fig. 2271 - - - - - - - - - - - - - - - - $0 40
No. 2, with shaft, fig. 2273 - - - - - - - - - - - - - - - 1 25

Fig. 2273

With shaft

Reverse cord, ¼ and ⅜ inch, Manila - - - - - - - - - - - - - - per pound $0 20
Telegraph cord, (6-thread seizing) - - - - - - - - - - - - - - - per pound 25
Telegraph cord, wire, 100 feet - 60
Telegraph cord, wire, 150 feet - 90

Fig. 1532

RUBBER BELTING

THREE-PLY	
Size, inches	Price, per foot
2	$0 17
2½	22
3	26
3½	30
4	34
4½	39
5	43
6	52
7	60
8	70
9	80
10	90
11	1 00
12	1 08
13	1 18
14	1 28
15	1 38
16	1 50
18	1 70
20	1 90
22	2 12
24	2 36
26	2 60
28	2 84

FOUR-PLY	
Size, inches	Price, per foot
2	$0 21
2½	26
3	31
3½	37
4	42
4½	47
5	52
6	62
7	73
8	84
9	95
10	1 07
11	1 18
12	1 30
13	1 42
14	1 54
15	1 66
16	1 78
18	2 02
20	2 26
22	2 52
24	2 80
26	3 08
28	3 36
30	3 64
32	3 92
34	4 20
36	4 48
38	4 76
40	5 04
42	5 32
44	5 60
46	5 88
48	6 16

FIVE-PLY	
Size, Inches	Price, per foot
8	$1 05
9	1 18
10	1 33
11	1 47
12	1 62
13	1 77
14	1 92
15	2 07
16	2 22
18	2 52
20	2 82
22	3 15
24	3 50
26	3 85
28	4 20
30	4 55
32	4 90
34	5 25
36	5 60
38	5 95
40	6 30
42	6 65
44	7 00
46	7 35
48	7 70

SIX-PLY	
Size, Inches	Price, per foot
8	$1 26
9	1 42
10	1 60
11	1 77
12	1 95
13	2 13
14	2 31
15	2 49
16	2 67
18	3 03
20	3 39
22	3 78
24	4 20
26	4 62
28	5 04
30	5 46
32	5 88
34	6 30
36	6 72
38	7 14
40	7 56
42	7 98
44	8 40
46	8 82
48	9 24

List on 8-ply rubber belt is double that of 4-ply; on 10-ply, 2½ times that of 4-ply.

STITCHED CANVAS BELTING

FOUR-PLY	
Size, Inches	Price, per foot
3	$0 30
4	40
5	50
6	60
7	70
8	80
9	90
10	1 00
12	1 20
14	1 47
16	1 68

SIX-PLY	
Size, Inches	Price, per foot
6	$0 87
7	1 02
8	1 16
9	1 31
10	1 45
12	1 74
13	1 99
14	2 13
16	2 44
18	2 74
20	3 05

EIGHT-PLY	
Size, Inches	Price, per foot
10	$1 90
12	2 28
14	2 79
16	3 19
18	3 59
20	3 99
22	4 39
24	4 79
26	5 43
28	5 85
30	6 27

LEATHER BELTING

Width, in.	1½	1¾	2	2¼	2½	2¾	3	3½	4	4½	5	6	7	8	9	10	11	12
Per foot	$0 36	42	48	54	60	66	72	84	96	1 08	1 20	1 44	1 68	1 92	2 16	2 40	2 64	2 88

Double leather belts have double the above list.

BELT CLAMPS

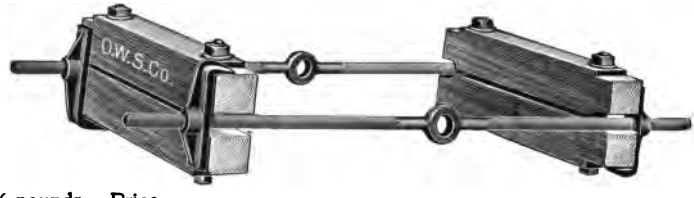
Fig. 1540

Size - - - - - - - - - inches	8	10	12	14
Regular - - - - - - - - - -	$0 20	25	30	- -
Extra heavy - - - - - - - -	30	35	40	75

Extra bolts, $\frac{3}{8}$ x $1\frac{1}{2}$ inch - - - - $0 02 Extra bolts, $\frac{7}{16}$ x $1\frac{3}{4}$ inch - - - - $0 03

BELT TIGHTENER

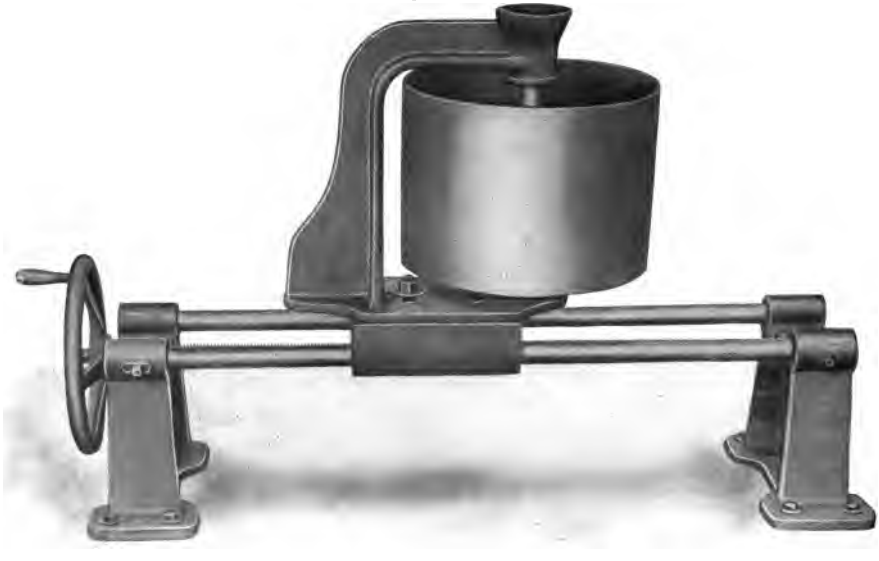
Fig. 2604



Weight, 46 pounds. Price - $7 50

THE "GEM" SELF-OILING BELT TIGHTENER

Fig. 2606



The "Gem" Belt Tightener is constructed entirely of metal and may be set at any angle to allow the belt to run up or down as may be desired. The screw is stationary and does not extend outside the frame.

Price, each - $29 00

BELT HOOKS

No.	15	14	13	12	11	10	9	8
Per 100	$0 20	24	26	28	30	35	40	50
No.	7	6	5	4	3	2	1	
Per 100	$0 60	85	1 10	1 40	1 60	2 00	3 00	

Fig. 2609

BELT PLACER

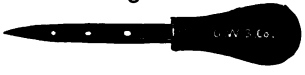
Patent tool for putting on belts - - - - - - - - - - - - $5 00

Fig. 2607

BELT PUNCH

No.	9	10	12	14	15	16
Size (in hundredths)	.24	.28	.35	.45	.50	.55
Per dozen	$2 25	2 50	2 50	5 00	----	----

Fig. 2611



BELT AWL

Price - $0 75

BELT LACINGS

CUT

Size - inches	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Per 100 feet	$1 25	1 50	1 75	2 25	3 00	3 75	4 00

BELT LACINGS

TIPPED ENDS

Length - feet	6	$6\frac{1}{2}$	7
Width - inches	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Per dozen	$1 70	2 10	2 75

LACE LEATHER

All sizes - Per square foot, $0 40

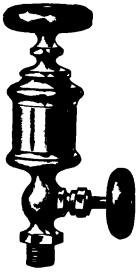
GREEN SEAL BELT DRESSING

For cotton, leather or rubber belting - - - - - - - - - - - - - - - Per pound, $0 35

In ordering, state whether for cotton, leather or rubber belting.

LUBRICATORS

COMMON
Fig. 4745

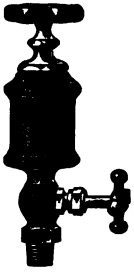


BRASS, STEAM METAL—Fig. 4745

Number	CO	0	1	2	3
Shank pipe thread, inches	⅜	⅜	⅜	¾	½
Diameter	1	1¼	1½	1¾	2
Price	$2 00	2 20	2 40	2 60	2 90

Number	4	5	6	7	8
Shank pipe thread, inches	½	½	¾	¾	¾
Diameter	2¼	2½	3	3½	4
Price	$3 25	3 75	4 75	7 00	10 00

IRON BODY
Fig. 4746



BRONZED, IRON BODY, ROUGH, WITH IRON WHEELS—Fig. 4746

Diameter, inches	Capacity, pints	Threaded iron pipe	Price
2	5/32	½	$2 25

"CYCLONE" IMPROVED No. 2 SIGHT FEED LUBRICATOR

Fig. 4729

Capacity	¼ pint	½ pint	1 pint	1 quart	½ gal.	1 gal.
Size sight feed glass - inches	⅝ x 2¾	¾ x 2¾	¾ x 2⅝	¾ x 2¾	½ x 3¼	¾ x 3¼
Size gauge glass - - inches	⅝ x 2¾	⅝ x 2¾	⅝ x 3¾	⅝ x 4¾	¾ x 7¼	¾ x 8¾
Shank threaded - - inches	⅜	½	½	½	¾	¾
Double con'ct'n, finished brass	$13 30	15 00	20 00	26 75	38 35	60 00
Double con'ction, nickel plated	14 30	16 00	21 35	28 35	40 35	63 35
Single con'ction, finished brass	15 80	17 50	22 50	29 25	40 85	62 50
Single con'ction, nickel plated	16 80	18 50	23 85	30 85	42 85	65 85
Weight - - - - - - lbs.	**5.2**	**6.4**	**7.3**	**9.2**	**18.4**	**19.8**

THE "SWIFT" DOUBLE CONNECTION SIGHT FEED LUBRICATOR

Fig. 4731

CLASS F.

Capacity	Pipe thread, inches	For engine cylinder, inches	Brass finished	Nickel plated	Weight, lbs.
¼ pint	⅜	Up to 5	$2 75	$3 15	2.25
½ pint	⅜	5 to 8	3 00	3 40	2.5
½ pint	⅜	8 to 12	3 25	3 65	3
1 pint	½	12 to 20	4 65	5 30	4.5
1½ pint	½	12 to 24	5 40	6 05	5.75
1 quart	½	20 to 30	6 15	6 80	6.5

THE "SWIFT" SINGLE CONNECTION SIGHT FEED LUBRICATOR

Fig. 4732

CLASS F. S. C.

Capacity	¼ pint	½ pint	½ pint	1 pint	1½ pint	1 quart
Pipe thread - - - inches	⅜	⅜	⅜	½	½	½
Brass finish	$3 50	3 75	4 00	6 00	6 75	7 50
Nickel plated	3 90	4 15	4 40	6 65	7 40	8 15
Weight - - - - - lbs.	**3.25**	**3.38**	**3.5**	**6**	**7**	**7.5**

THE O. W. S. CO. TWO-QUART ENGINE LUBRICATOR

Fig. 4747

Is designed especially for Drilling and Pumping Engines, but can be used to advantage in any Steam Engine.

For lease work the saving over old style oil cup will pay the difference in a single month, besides insuring perfect lubrication.

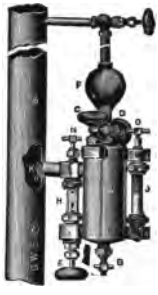
Weight, boxed, 47 lbs. Price complete - - - - - - - - - - - - - - - $20 00 each

PARTS	Price
Cast Iron Body or Reservoir	$5 00
Brass Sight Feed complete	7 40
U. Bolt and Nuts, each	50
Lubricator Glass, each	30
2″ Pipe, threaded and tapped	1 05

DETROIT IMPROVED STANDARD SIGHT FEED LUBRICATORS

FOR STEAM ENGINES, PUMPS, ETC.

Fig. 4738



Capacity	Pipe thread, inches	Suitable for cylinder	Plain brass	Nickel plated	Weight, lbs.
⅓ pint	½	Under 10 in. diam.	$17 00	20 00	8
½ pint	½	10 to 12 inch diam.	22 00	25 00	10.5
1 pint	½	12 to 18 inch diam.	30 00	35 00	13.5
1 quart	½	18 to 30 inch diam.	45 00	50 00	16
½ gallon	¾	30 and over	60 00	65 00	29
1 gallon	¾		75 00	80 00	34

Fig. 4739

Pint size and larger.

⅛ and ¼ pint sizes.

"PIONEER" SLIDE TOP GLASS OIL CUP

Fig. 4718

Number	000	00	0	1	1½	2	3	4	5	6
Extreme outside diameter of cup, inches	1⅜	1 7/16	1⅝	1⅞	2⅛	2⅜	2 13/16	2 5/16	3⅝	3 5/16
Extreme height of cup (over all) - inches	2¾	2 15/16	3 3/16	3¾	4 1/16	4 7/16	4¾	5	6	7¼
Outside diameter of glass - - - inches	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½
Height of glass - - - - - - - inches	⅞	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity - - - - - - - - ounces	¼	½	⅝	1	1½	2½	4	5	10	18
Shank pipe thread - - - - - - inches	⅛	⅛	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished brass - - - - - - - - -	$0 70	75	80	1 00	1 25	1 50	1 90	2 40	3 10	4 00
Nickel plated - - - - - - - - -	80	85	95	1 20	1 50	1 75	2 20	2 75	3 50	4 50

"SENTINEL" SNAP LEVER, SIGHT FEED GLASS OIL CUP

Fig. 4718-A

LEVER UP

Number	0	1	1½	2	3	4	5	6
Extreme outside diam. cup - inches	1⅝	2⅛	2 1/8	2⅜	2 1/8	2 5/16	3⅝	3 5/16
Extreme height of cup, over all, (lever up) - - - - - inches	5 1/16	5 9/16	5 15/16	6¼	6¾	7 7/16	8 5/16	9½
Outside diameter of glass - inches	1½	1½	1¾	2	2¼	2½	3	3½
Height of glass - - - - inches	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Shank pipe thread - - - inches	⅛	¼	¼	⅜	⅜	⅜	½	½
Capacity - - - - - ounces	⅝	1	1½	2½	4	5	10	18
Finished brass - - - - - - -	$3 00	3 25	3 50	3 75	4 25	5 25	7 25	9 25
Nickel plated - - - - - - -	3 50	3 75	4 00	4 25	4 75	5 75	8 00	10 25

Fig. 4719

OIL CUPS, ETC.

LUNKENHEIMER'S "ROYAL" SIGHT FEED GLASS OIL CUP

Number	000	00	0	1	1½	2	3	4	5	6
Outside diameter of glass - inches	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½
Height of glass - - - - inches	⅞	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Shank, pipe thread - - - inches	⅛	⅛	⅛	¼	¼	⅜	⅜	⅜	½	½
Capacity - - - - - - ounces	¼	½	⅝	1	1½	2½	4	5	10	18
Finished brass - - - - - - -	$0 95	1 10	1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80
Nickel plated - - - - - - - -	1 05	1 20	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30

Fig.4725

"CHAMPION" ROD OIL CUP

SUITABLE FOR ALL MOVABLE BEARINGS

No.	Capacity, ounces	Outside diameter, inches	Height of cup closed, inches	Height of cup open, inches	Width, inches	Shank, pipe thread, inches	Price, finished brass	Price, nickel plated	Glasses, each
1	1¼	2	3¼	4¼	1⅝	¼	$1 40	1 50	05
2	2½	2½	3⅞	4⅞	2	⅜	2 00	2 20	08
3	5	3	4⅝	5⅞	2¼	½	2 60	2 80	10
4	12	4	5¾	7¼	4	¾	4 00	4 40	15

Fig. 4722

CROWN INDEX SIGHT FEED OIL CUP

Number	0	1	1½	2	3	4	5	6
Outside diam. of glass - - inches	1¼	1½	1¾	2	2¼	2½	3	3½
Capacity - - - - - - ounces	⅝	1	1½	2½	4	5	10	18
Pipe thread - - - - - inches	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished brass - - - - each	$1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80
Nickel plated - - - - . each	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30

Fig. 4724

PARAGON SIGHT FEED OIL CUP

FOR GASOLINE AND OIL ENGINES

Number	1½	2	3	4	5	6	8
Outside diam. of glass - - - inches	1¾	2	2¼	2½	3	3½	4¼
Capacity - - - - - - - ounces	1½	2½	4	5	10	18	32
Pipe thread - - - - - - inches	¼	⅜	⅜	⅜	½	½	¾
Finished brass - - - - - each	$2 00	2 80	3 50	4 00	5 40	7 00	14 00
Nickel plated - - - - - each	2 40	3 25	4 10	4 60	6 25	8 20	16 40

Fig. 4717

CYLINDRICAL GLASS

FOR OIL CUPS

Number	000	00	0	1	1½	2	3	4	5	6	8
Outside diameter - - inches	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½	4¼
Height - - - - - inches	⅞	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4	5
Price - - - - - - each	$0 05	05	05	10	10	12	15	25	35	65	1 50
Cork washers - - per dozen	15	18	24	30	36	40	45	50	60	75	1 50

LUNKENHEIMER'S "IDEAL" AUTOMATIC GREASE CUP

Fig. 4723

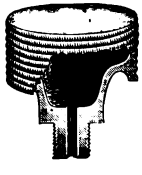
Number	00	0	1	2	3	4
Extreme outside diameter - - - - inches	1⅜	1¾	2	2⅝	3¼	3⅝
Extreme height - - - - - - - inches	3¼	4⅝	5¼	6½	7½	8¾
Shank, pipe thread - - - - - - - inches	⅛	¼	¼	⅜	½	½
Capacity (grease) - - - - - - - ounces	½	1	1½	3	6	10
Finished brass - - - - - - - - - -	$1 50	2 00	2 50	3 20	4 30	6 00
Nickel plated - - - - - - - - - -	1 75	2 25	2 80	3 60	5 00	6 75

JEWEL AUTOMATIC GREASE CUP

Fig. 4726

Number	00	0	1	2	3	4
Inside diameter - - - - - - - - inches	1	1¼	1½	2	2½	3
Pipe thread - - - - - - - - - inches	⅛	¼	¼	⅜	½	½
Capacity - - - - - - - - - ounces	⅛	1	1½	3	6	10
Finished Brass - - - - - - - - each	$0 80	1 00	1 30	1 70	2 30	3 20
Nickel Plated - - - - - - - - each	1 00	1 30	1 70	2 20	2 90	3 90

Fig. 4727



REX GREASE CUP, SPUN TOP

Number	6	7	8	9
Inside diameter - - - - - - - - - inches	1⅝	1⅞	2⅛	2⅝
Pipe thread - - - - - - - - - - inches	⅛	¼	⅜	⅜
Capacity - - - - - - - - - - - ounces	⅔	1⅓	3½	5
Each - - - - - - - - - - - - - -	$0 55	70	90	1 20

ARCTIC CUP GREASE

In 10 pound pails - per pound.	$0 12
In 5 pound pails - per pound.	15

BRASS AIR COCKS

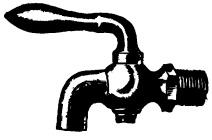
STEAM METAL

Fig. 4690

Fig. 4694

Fig. 4695

Fig. 4698



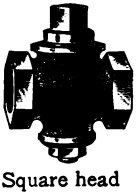
Sizes - inches	⅛	¼	⅜	½
T-handle, single thread, fig. 4690	$0 40	45	50	60
T-handle, double thread	55	65	75	90
T-handle, bibb nozzle, single thread, fig. 4694	70	80	90	1 00
T-handle, bibb nozzle, double thread	80	1 00	1 10	1 35
Weight per 100 - lbs.	13	18	25	32
Lever handle, single thread, fig. 4696	55	60	65	75
Lever handle, double thread	70	80	90	1 05
Lever handle, bibb nozzle, single thread, fig. 4698	85	95	1 05	1 15
Lever handle, bibb nozzle, double thread	95	1 15	1 25	1 50
Weight per 100 - lbs.	16	21	28	35
T-handle, female	65	70	85	- - -
T-handle, male and female	75	80	90	- - -
Lever handle, female	80	85	1 00	- - -
Lever handle, male and female	90	95	1 05	- - -

BRASS STEAM COCKS

STEAM METAL

STANDARD

Fig. 4659

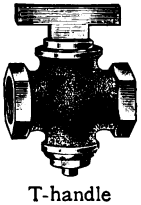


Square head

Fig. 4658

Flat head

Fig. 4656



T-handle

Fig. 4655

Lever handle

Sizes - - - inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Square or flat head or T-handle - fig. 4659 / fig. 4658 / fig. 4656	$0 85	85	1 00	1 25	1 70	2 35	3 70	4 85	7 30	14 50	22 50	38 50	50 00
Weight - - - lbs.	- - -	**.25**	**.44**	**.63**	**1.4**	**2**	**2.4**	**4.4**	**6.5**	**10**	**17**	- - -	- - -
Lever handle, fig. 4655	95	95	1 10	1 35	1 85	2 60	4 10	5 25	7 80	- - -	- - -	- - -	- - -
Weight - - - lbs.	- - -	**.5**	**.8**	**1.2**	**1.5**	**2.8**	**3.8**	**7**	**10**	- - -	- - -	- - -	- - -

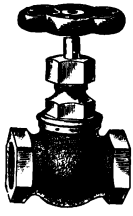
EXTRA HEAVY OR No. 1

Sizes - - - - inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Ex. heavy or No. 1 sq. and flat head or T-H'dl	$1 30	1 30	1 50	2 00	2 85	4 00	6 75	8 50	13 50	25 00	37 00	54 00	75 00
Weight - - - lbs.	- - -	- - -	**.5**	**.8**	**1.5**	**2.4**	**3.3**	**5.1**	**8.4**	**13**	**17.5**	- - -	- - -
Extra heavy lever H'dl	1 40	1 40	1 60	2 10	3 00	4 25	7 15	8 90	14 00	- - -	- - -	- - -	- - -
Weight - - - lbs.	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BRASS GLOBE AND ANGLE VALVES

STANDARD—SCREWED — **EXTRA HEAVY OR No. 1—SCREWED**

Fig. 4617 **Fig. 4618** **Fig. 4620** **Fig. 4620-A**



Globe

Angle

Globe

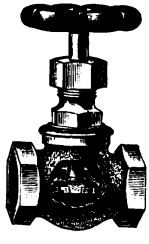
Angle

Sizes - - - - - - - - - - - inches	⅛	¼	⅜	½	¾	1	1¼
Standard, figs. 4617, 4618 - - - - - -	$0 72	72	77	1 00	1 26	1 80	2 52
Weight - - - - - - - - - - lbs.	**.45**	**.45**	**.6**	**.9**	**1.5**	**2.3**	**3.2**
Extra heavy or No. 1, figs. 4620, 4620-A -	$1 25	1 25	1 45	1 85	2 50	3 50	5 25
Weight - - - - - - - - - - lbs.	**.5**	**.5**	**.7**	**1 1**	**1.7**	**2.7**	**4**

Sizes - - - - - - - - - - - - - inches	1½	2	2½	3	3½	4
Standard, figs. 4617, 4618 - - - - - - - -	$3 50	5 30	10 00	14 40	26 50	36 00
Weight - - - - - - - - - - - - lbs.	**4.4**	**7**	**11**	**17**	-----	-----
Extra heavy or No. 1, figs. 4620, 4620-A - - -	$7 00	10 50	20 00	27 00	50 00	65 00
Weight - - - - - - - - - - - - lbs.	**5.7**	**9.7**	**14.5**	**21**	-----	-----

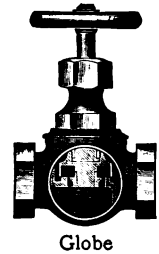
FRINK'S PATENT VALVES — **JENKINS' PATENT VALVES**

Fig. 4625 **Fig. 4625-A** **Fig. 4626**



Globe

Angle



Globe

Sizes - - - - - - - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Frink, globe or angle - - - -	$0 80	1 00	1 25	1 75	2 50	3 35	4 60	7 00	14 00	20 00
Weight - - - - - - - - lbs.	**.6**	**.65**	**.7**	**1.5**	**2.4**	**3.2**	**4.7**	**7.7**	-----	-----
Jenkins, globe or angle - - - -	$1 10	1 25	1 60	2 20	2 80	4 00	5 50	8 75	15 75	22 00
Weight - - - - - - - - lbs.	**.8**	**.8**	**1.4**	**1.6**	**2.5**	**3.3**	**5**	**8.3**	**22**	**27**

DISKS

For all patterns of Frink's and Jenkins' disk valves

Sizes - - - - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price - - - - - - -	$0 03	04	04	05	06	09	12	18	24	33	45	52

Sizes - - - - inches	4½	5	6	7	8	10	12	14	16	18	20	24
Price - - - - - - - -	$0 60	68	90	98	1 20	1 75	2 25	3 00	4 00	5 00	6 00	9 00

STANDARD BRASS CHECK VALVES

STEAM METAL

HORIZONTAL

Fig. 4635

Screwed

ANGLE

Fig. 4638

Screwed

Sizes - - - - - - - - inches	⅛	¼	⅜	½	¾	1	1¼
Horizontal, screwed, fig. 4635 - - - -	$0 65	65	70	90	1 15	1 60	2 25
Weight - - - - - - - lbs.	- - -	- - -	**.25**	**.5**	**.9**	**1.5**	**2.1**
Angle, screwed, fig. 4638 - - - - -	$0 72	72	77	1 00	1 26	1 80	2 52
Weight - - - - - - - lbs.	- - -	- - -	- - -	- - -	- - -	- - -	- - -

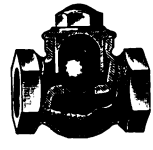
Sizes - - - - - - - inches	1½	2	2½	3	3½	4	- - -
Horizontal, screwed, fig. 4635 - - -	$3 15	4 75	9 00	13 00	24 00	32 50	- - -
Weight - - - - - - - lbs.	**3**	**5.4**	**8.9**	**14.6**	- - -	- - -	- - -
Angle, screwed, fig. 4638 - - - -	$3 50	5 30	10 00	14 40	26 50	36 00	- - -
Weight - - - - - - - lbs.	- - -	- - -	- - -	- - -	- - -	- - -	- - -

HORIZONTAL

Fig. 4636

With Drip Cock

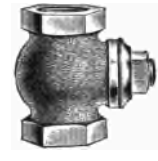
Fig. 4637



With Ball

VERTICAL—Cap at side

Fig. 4640



Screwed

Sizes - - - - - - - inches	½	¾	1	1¼	1½	2	2½	3
With drip cock, fig. 4636 - - -	$2 15	2 55	3 15	4 05	5 40	- - -	- - -	- - -
With ball, fig. 4637 - - - -	1 60	2 30	3 10	4 00	6 20	9 40	- - -	- - -
Vertical, screwed, fig. 4640 - -	1 85	2 50	3 25	4 15	5 00	7 25	18 00	25 00
Weight - - - - - lbs.	.6	**1**	**1.5**	**2.2**	**3.5**	**6**	- - -	- - -

VERTICAL

Fig. 4639

Screwed

Fig. 4643

Ball

STRAIGHTWAY SWINGING CHECKS

NEARY

Fig. 4642

PRATT & CADY

Fig. 4646

Sizes - - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Vertical, screwed, fig. 4639 - - -	$0 72	77	1 00	1 26	1 80	2 52	3 50	5 30	10 00	14 40	26 50	36 00
Vertical, ball, fig. 4643	- - -	- - -	1 60	2 30	3 10	4 00	6 20	9 40	- - -	- - -	- - -	- - -
Weight - - - lbs.	**.25**	**.4**	**.5**	**.8**	**1.5**	**1.7**	**2.4**	**3.7**	**8.9**	**14.5**	- - -	- - -
Neary swinging check, fig. 4642	$1 25	1 30	1 50	1 75	2 25	3 25	4 25	6 25	12 00	20 00	- - -	- - -
Pratt & Cady, fig. 4646	1 25	1 30	1 50	1 75	2 25	3 25	4 25	6 25	12 00	20 00	- - -	- - -
Weight - - - lbs.	- - -	- - -	**.8**	**1.4**	**1.8**	**3**	**4.3**	**5.2**	**11.8**	- - -	- -	- - -

EXTRA HEAVY OR No. 1 BRASS CHECK VALVES

STEAM METAL

HORIZONTAL
Fig. 4645

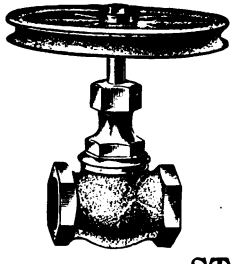
Screwed

ANGLE
Fig. 4645-B

Screwed

Sizes - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Horizontal and angle, screwed	$1 10	1 30	1 65	2 20	3 00	4 75	6 25	9 50	18 50	25 00	47 00	60 00
Weight - lbs.	-----	.5	.6	1	1.7	2.5	3.8	6.5	13	21	-----	-----

Fig. 4619



GLOBE VALVE

WITH LARGE GROVED WHEEL

Sizes - - - - - - - - - - - - inches	1¼	1½	2
Brass - - - - - - - - - - - - each	$4 00	5 00	7 00
Iron Body - - - - - - - - - - "	4 50	5 50	7 50

STANDARD IRON BODY VALVES

BRASS MOUNTED

GLOBE
Fig. 4900

Screwed

Sizes - - - - - inches	¾	1	1¼	1½
Iron body, screwed, globe or angle - - - - - -	- ---	$2 25	2 75	3 50
All iron, screwed, not illustrated, globe or angle -	----	5 70	6 00	6 60
Weight - - - - - lbs.	-	3.4	3.9	4.3

Sizes - - - - - inches	2	2½	3	
Iron body, screwed, globe or angle - - - - - -	5 40	7 35	9 80	------
All iron, screwed, not illustrated, globe or angle -	7 50	9 40	12 50	------
Weight - - - - - lbs.	10.8	15.8	23.5	------

ANGLE
Fig. 4903

Screwed

HORIZONTAL
Fig. 4923

Screwed

STANDARD IRON BODY CHECK VALVES

HORIZONTAL AND ANGLE, WITH BRASS CAP

Sizes - inches	1	1¼	1½	2	2½	3
Horizontal and angle, screwed	$1 50	2 20	2 65	3 60	6 50	8 90
Weight - lbs.	----	----		8	13	18.6

ANGLE
Fig. 4931

Screwed

BRASS GATE VALVES—BURNHAM'S

QUICK OPENING WITH SLIDING STEM AND LEVER

Fig. 4852

Sizes - - - - Inches	½	¾	1	1¼	1½	2	2½	3
Each - - - - - - -	$2 50	3 00	4 00	5 00	7 00	10 00	19 00	25 00
Weight - - - - lbs.	--	4.4	5,5	---	---	10.6	16	---

IRON COCKS

SQUARE AND FLAT HEAD

Fig. 4983

Square head

No. 1—HEAVY PATTERN

Fig. 4984

Flat head

Sizes - - inches	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Weight - - lbs.	**1.5**	**2.1**	**4.2**	**5**	**9**	**14**	**20**	**29**	-----	**70**	-----	-----
All iron, square or flat head - - -	$1 15	1 25	1 75	2 10	2 80	3 65	6 50	9 00	16 75	22 50	45 00	62 00
With brass washer	1 25	1 40	2 00	2 45	3 20	4 15	7 25	10 00	18 75	26 00	51 00	70 00
With brass plug -	1 70	2 25	2 80	3 85	5 60	7 00	13 25	19 00	42 00	56 00	98 00	133 00
With brass plug and washer - -	1 80	2 40	3 05	4 20	6 00	7 50	14 00	20 00	44 00	59 50	104 00	141 00

Fig. 4985

Square head

No. 2—REGULAR PATTERN

Fig. 4986

Flat head

Sizes - inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Weight - lbs.	-----	**1.1**	**1.6**	**2.4**	**4.3**	**6**	**10**	**17**	**27**	-----	-----	-----	-----
All iron, square or flat head -	$0 85	90	1 05	1 30	1 60	1 95	2 70	4 40	6 75	12 00	15 50	32 00	45 00
With brass washer - -	-----	1 00	1 20	1 55	1 95	2 35	3 20	5 15	7 75	14 00	19 00	38 00	53 00
With brass plug	1 25	1 30	1 60	1 90	2 65	3 75	5 25	8 75	13 00	27 50	36 50	67 00	94 00
With brass plug and washer -	-----	1 40	1 75	2 15	3 00	4 15	5 75	9 50	14 00	29 50	40 00	73 00	102 00

Fig. 4987

ROUND WAY

Sizes - - - - - - - - - - - - - - - inches	2	3
Weight - - - - - - - - - - - - - - - lbs.	**25**	-----
With iron nut and washer - - - - - - - - - -	$8 50	-----
With iron nut and brass washer - - - - - - - -	9 00	18 25
With brass plug, nut, and washer - - - - - - -	13 50	27 00

IRON LOCK COCKS

ESSEX PATENT

Fig. 4996

Weight 2 in., 16 lbs.

Sizes - - - - - - inches	2	2½	3
With brass washer, fig. 4996 - -	$2 50	3 85	5 50
With brass plug, fig. 4996 - - -	5 00	7 50	12 00
With brass plug, extra heavy - -	6 00	....	24 00
Roundway, brass washer - - -	3 75	5 90	7 50
Roundway, brass plug - - - -	6 50	9 50	15 50

Lock cocks, fig. 4995, made to order.

FLANGED TOP

Fig. 4995

Weight 2 in., 27 lbs.

MALLEABLE IRON FITTINGS

FOR STEAM, GAS, AND WATER

PRICE LIST PER PIECE

Sizes - - - - - - inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Elbows - - - - - - - -	$0 04	04	06	10	15	22	25	35	50	80	1 50	2 25	3 00
Elbows, right and left - - -	.....	05	07	12	17	25	30	40	65	....	....	....	..
Elbows, 45° - - - - - - -	.....	08	10	12	18	26	36	54	82	1 25	2 50	3 25	4 50
Elbows, service or street - -	.....	..	10	12	20	25	40	55	90	1 50	....	....	....
Elbows, S. O - - - - - - -	.....	..	08	10	18	30	45	60	....	....	....	....	....
Elbows, drop - - - - - - -	.....	06	08	12	20	25	..	....	....	....	....	....	....
Tees - - - - - - - -	07	07	08	11	15	25	30	45	60	1 05	1 70	2 50	3 40
Tees, four-way - - - - - -	.....	..	12	14	20	35	50	80	....	....	....	....	....
Tees, drop - - - - - - -	.....	08	10	14	22	30	..	....	....	....	....	....	....
Crosses - - - - - - - -	.....	08	10	12	20	30	40	60	1 00	1 75	3 00	3 25	5 25
Return bends, close - - -	.....	..	..	13	25	35	50	75	1 00	....	....	....	....
Return bends, left hand, or right and left, close - -	.....	..	..	15	30	45	60	90	1 25	....	....	....	....
Return bends, open - - - -	.....	..	..	15	30	50	65	85	1 25	2 00	3 00	....	....
Return bends, left hand, or right and left, open - -	.....	..	..	20	38	60	80	1 05	1 55	2 50	3 75	....	....
Caps - - - - - - - -	.....	03	04	05	08	12	16	24	32	45	85	1 50	2 00
Plugs - - - - - - - -	.....	03	03	05	08	10	16	19	30	....	....	....	....
Extension pieces - - - -	.....	..	04	06	10	13	..	....	....	....	....	....	....
Couplings, right hand - - -	03	03	04	07	10	14	20	25	35	....	....	....	....
Couplings, reducing - - -	.....	03	03	05	10	16	20	28	45	70	1 00	1 50	1 85
Couplings, right and left - -	.....	04	05	08	12	16	25	36	52	....	....	....	....
Locknuts - - - - - - - -	.....	02	03	04	05	07	09	11	18	40	50	....	....
Waste nuts - - - - - - -	.....	04	05	06	08	10	..	....	....	....	....	....	....
Tinned straps - - - - - -	.....	02	02	02	03	04	05	06	....	....	....	....	....
Wall brackets - - - - - -	.....	..	05	..	..	..	..	....	....	....	....	....	....
Chandelier hooks or loops -	.....	..	10	12	..	..	..	....	.. ..	....	....	....	....

PRICE LIST PER PIECE—GALVANIZED

Sizes - - - - - - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Elbows - - - - - - - - -	$0 05	08	14	20	32	40	60	90	1 35	2 60	3 75	5 00
Elbows, 45° - - - - - - -	12	15	20	25	40	50	85	1 35	....	....		....
Elbows, service or street - - -	.....	12	15	28	35	55	80	1 30	2 50	....	....	....
Elbows, drop - - - - - - -	10	12	20	35	40	..	....	....	....	....	....	....
Tees - - - - - - - - -	09	10	16	20	38	50	70	1 00	1 90	3 00	4 25	5 75
Tees, drop - - - - - - - -	.....	15	25	40	55	..	....	....	....	....	....	....
Crosses - - - - - - - - -	.....	15	17	25	45	60	90	1 50	2 75	4 25	5 00	8 00
Return bends, close - - - - -	.....	..	25	35	55	75	1 15	1 65	....	....	....	....
Return bends, open - - - - -	.....	..	25	45	70	90	1 25	2 00	3 50	5 00	....	....
Couplings, right hand - - - -	05	07	10	17	23	30	40	55	....	....	....	....
Couplings, reducing - - - -	.....	05	08	15	25	35	45	75	1 05	1 65	2 40	3 05
Couplings, right and left - - -	06	08	10	17	25	35	55	75	....	....	....	....
Caps - - - - - - - - -	04	05	08	12	17	24	38	52	76	1 30	....	....
Plugs - - - - - - - - -	05	05	07	11	15	25	30	45	....	....	....	....
Locknuts - - - - - - - - -	03	04	05	07	10	14	20	30	55	70	....	....
Waste nuts - - - - - - - -	06	08	10	15	20	..	....	....	....	....		....

REVISED CLASSIFICATION AND PRICE LIST.

Adopted June 5, 1907.

MALLEABLE IRON FITTINGS

FOR STEAM, GAS AND WATER.

CLASS	A	B	C
Price, per pound, black	.40	.20	.12
Price, per pound, galvanized	.50	.28	.19
Elbows	⅛x⅛ ¼x⅛ ⅜x⅛	¼x¼ ⅜x¼ ½x½ ⅜x⅜ ½x¼ ½x⅜	*¾ and larger
Elbows, right and left	¼ and ⅜	½, ¾ and 1	*1¼ and larger
Elbows, 45°		¼ to 2 inclusive	2½ and larger
Elbows, Street		¼ and ⅜ ½ and ¾ ¾x½ and 1x¾	1 and larger
Elbows, Side Outlet		All Sizes	
Elbows, drop		All Sizes, Reducing and Straight	
Tees	⅛x⅛ ⅛x¼ ¼x⅛ ⅜x⅛	¼x¼ ⅜x⅜ ¼x⅜ ⅜x¼x¼ ⅜x¼ ⅜x¼x⅜ ½, and ½ Reducing	*¾ and larger
Tees, street		¾ and 1x¾x1	1 and larger
Tees, Four-way		All sizes	
Tees, drop		All Sizes, Straight and Reducing	
Straight Crosses		¼ to 1 inclusive	1¼ and larger
Reducing Crosses		1 and Smaller	*1¼ and larger
Y Bends		All Sizes	
Return Bends	¼	⅜ to 1 inclusive	1¼ and larger
Return Bends, Right and Left	⅜ and ½	¾ and larger	
Couplings, R. H.	⅛	¼ to ¾ inclusive	1 and larger
Couplings, R. and L.	⅛	¼ to ¾ inclusive	1 and larger
Couplings, Reducing	¼x⅛ ⅜x⅛ ½x⅛	⅜x¼ to 1x¾ inclusive	1¼ and larger
Caps	⅛	¼ to 1 inclusive	1¼ and larger
Locknuts	⅛	¼ to 1¼ inclusive	1½ and larger
Extension Pieces		All Sizes	
Waste Nuts		All Sizes	
Chandelier Hooks		All Sizes	
Wall Plates		All Sizes	
Pump Rod Couplings	⅜, ⅝ x 7/16, 7/16	½ and ¾	

*Fittings in Class C having one or more outlets smaller than ¾ will be charged in Class B.

Above prices on Galvanized Fittings are for Standard Sizes only. Other sizes will be made to order at a special price according to quantity ordered.

The run of Tees, (Bullheads), gives the size for the purpose of classification, and the outlet being larger does not change it.

IN ORDERING BE PARTICULAR TO MENTION BEADED OR PLAIN.

MALLEABLE IRON UNIONS

Fig. 4405

Fig. 4408

Fig. 4409

Sizes - - - - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Unions, fig. 4405 - - -	$0 18	20	22	27	33	46	58	75	1 55	2 10	3 65	4 35
Unions, fig. 4405, galv'zd.	27	30	33	40	50	70	90	1 15	2 35	3 15	5 50	6 50
"American," fig. 4408 black - -	20	24	28	35	40	56	80	95	2 00	2 75	----	----
"American," fig. 4408 galvanized	24	28	35	46	55	78	1 12	1 35	2 90	3 75	----	----
"American," fig. 4408 tinned - -	30	33	45	55	65	90	1 40	1 55	----	---	----	----
"Keystone," fig. 4409 black - -	20	24	28	35	40	56	80	95	----	---	----	---
"Keystone," fig. 4409 galvanized	24	28	35	46	55	78	1 12	1 35	----	---	----	----
"Keystone," fig. 4409 tinned - -	30	33	45	55	65	90	1 40	1 55	---	---	----	----
Weight - - - - - lbs.	**.2**	**.27**	**.5**	**.72**	**.94**	**1.4**	**1.8**	**2 8**	**3.5**	**5**	**7.8**	**5.8**

Fig. 4416

CAST IRON FLANGE UNIONS

PLAIN OR LIGHT PATTERN, Fig. 4416

Fig. 4414

With lip

Sizes - - - - inches	½	¾	1	1¼	1½	2	2½	3	3½
Diameter of flanges, inches	2 1/16	3 1/16	3 5/32	3 13/16	4 1/32	5 1/8	6 1/16	6 3/4	7 1/4
Number of bolts in each -	3	3	3	4	4	4	4	4	4
Weight - - - - lbs.	----	**1.9**	**2.1**	**2.5**	**3.7**	**6**	**7**	**9.5**	**11.5**
Black - - - - each	$0 40	46	52	64	78	1 00	1 25	1 50	1 80
Galvanized - - - "	80	92	1 04	1 28	1 56	2 00	2 50	3 00	3 60

Sizes - - - - inches	4	4½	5	6	7	8	9	10	12
Diameter of flanges, inches	7 13/16	8½	9 1/16	10	11 1/16	12⅛	13¼	15 1/16	17¼
Number of bolts in each -	4	5	5	6	7	8	9	10	12
Weight - - - - lbs.	**15.5**	**19**	**23.5**	**28.5**	**35**	**45**	**57**	**62**	**118**
Black - - - - each	$2 10	2 70	3 15	3 95	5 50	7 00	10 00	11 50	16 00
Galvanized - - - "	4 20	5 40	6 30	7 90	11 00	14 00	20 00	23 00	32 00

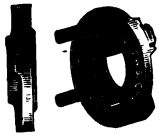
FLANGE UNIONS, WITH LIP, Fig. 4414

Sizes - - - - inches	½	¾	1	1¼	1½	2	2½	3	3½
Diameter of flanges, inches	3⅛	3⅜	3¾	4	4⅝	5⅝	6	6¾	7 9/16
Number of bolts in each -	4	4	4	4	4	4	4	4	4
Weight - - - - lbs.	----	----	**2.8**	**3.8**	**5.3**	**7.3**	**10**	**11.5**	**15.3**
Black - - - - each	$0 60	75	90	1 00	1 20	1 50	1 75	2 00	2 75
Galvanized - - - "	1 00	1 25	1 50	1 65	2 00	2 50	2 90	3 35	4 55

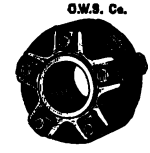
Sizes - - - - inches	4	4½	5	6	7	8	9	10	12
Diameter of flanges, inches	8⅛	8 7/16	9⅜	10¾	11⅞	13 3/16	14⅞	15¾	18
Number of bolts in each -	4	5	5	6	7	8	9	10	12
Weight - - - - - lbs.	**19**	**23.5**	**29**	**36**	**46**	**50**	**80**	**100**	**140**
Black - - - - - each	$3 00	3 50	4 00	5 00	7 00	10 00	15 00	17 50	20 00
Galvanized - - - "	5 00	5 85	6 65	8 35	11 65	16 65	25 00	29 00	34 00

CAST IRON FLANGE UNIONS

OIL COUNTRY PATTERN
Fig. 4502



FIVE BOLT
Fig. 4500



Sizes - - - - - - - - inches	1½	2	2½	3	3½	4	5	6
Oil country pattern - - - - - -	4 bolt $1 20	4 bolt 1 50	4 bolt 1 75	4 bolt 2 00	5 bolt 2 75	5 bolt 3 00	5 bolt 4 00	6 bolt 5 00
Weight - - - - - - - - lbs.	**6**	**7.5**	**10.5**	**13**	**23**	**25**	**27**	**33**
S. P. pattern - - - - - - - -	------	5 bolt $2 50	------	------	------	------	------	------
Weight - - - - - - - - lbs.	------	**11**	------	------	------	------	------	------
Extra heavy pattern - - - - - -	------	5 bolt $3 00	------	------	------	------	------	------
Weight - - - - - - - - lbs.	------	**20**	------	------	------	------	------	------

Fig. 4423

BUSHINGS

Fig. 4424

NOTE.—Bushings reducing but one size, 2½ inches and smaller, are malleable.

Sizes - - inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Fig. 4423 - - - -	$0 04	04	05	06	07	09	14	21	30	40
Faced, fig. 4424 - -	08	09	11	13	17	22	32	48	70	1 20
Weight - - lbs.	------	**.08**	**.17**	**.26**	**.46**	**.60**	**1**	**1.5**	**2.2**	**3.6**

Sizes - - - - - - inches	4	4½	5	6	7	8	9	10	12
Fig. 4423 - - - - - - -	$0 50	75	93	1 25	1 87	2 75	3 25	3 75	5 00
Faced, fig. 4424 - - - -	1 50	------	------	------	------	------	------	------	------
Weight - - - - - - lbs.	**4.5**	**6**	**7**	**12**	**13**	**15**	**15**	**18**	**26**

Fig. 4427

PLUGS

Fig. 4428

Sizes - - inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Fig. 4427 - - - -	$0 02	02	02	03	04	05	07	10	18	25
Solid - - - - -	04	04	04	06	08	09	11	15	27	38
Weight - - lbs.	**.03**	**.06**	**.11**	**.19**	**.23**	**.34**	**.46**	**.72**	**1.1**	**1.9**
Left hand - - - -	------	------	------	06	08	09	11	15	------	------
Socket, fig. 4428 -	------	------	04	06	08	09	11	15	------	------

Sizes - - inches	3½	4	4½	5	6	7	8	9	10	12
Fig. 4427 - - - -	$0 38	42	65	88	1 20	1 85	2 75	3 25	3 75	5 00
Solid - - - - -	57	63	1 00	1 35	1 80	2 80	4 15	5 00	5 75	7 50
Weight - - lbs.	**2.5**	**3**	**3.9**	**6.5**	**8.5**	**11**	**16**	**24**	**30**	**41**

CASING FITTINGS

CAST IRON

Sizes	2, 2¼ 2½, 2¾, 3	3¼	3½, 3¾	4	4¼	4½	4¾	5	5 3/16, 5⅝	6¼, 6⅝	7⅝	8¼, 8⅝	9⅝
Elbows	$1 10	1 35	1 80	2 50	2 50	3 00	3 00	3 50	4 00	7 00	10 00	13 00	20 00
Elbows, reducing	1 40	1 75	2 25	3 00	3 00	3 75	3 75	4 35	5 00	8 75	12 50	16 00	25 00
45° Elbows	1 60	2 00	2 70	3 75	3 75	4 00	4 00	4 50	5 50	9 00	13 00	16 00	25 00
Tees	1 50	2 00	2 50	3 50	3 50	4 00	4 25	5 00	5 50	10 00	15 00	20 00	25 00
Tees, reducing	1 85	2 50	3 00	4 35	4 35	5 00	5 25	6 25	6 75	12 50	18 75	25 00	30 00
Crosses	2 20	2 70	3 50	5 00	5 00	5 70	6 00	7 00	7 80	14 00	20 00	26 00	40 00
Crosses, reducing	2 75	3 30	4 35	6 25	6 25	7 00	7 50	8 75	9 70	17 50	25 00	32 00	50 00
Ys	3 25	4 50	6 00	8 00	8 00	9 00	9 00	10 00	12 00	17 00	25 00	- - -	- - -
Return bends, close	3 00	4 00	5 00	6 00	6 50	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Return bends, open	3 75	4 50	5 75	8 00	8 00	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Flange unions	2 25	2 75	3 15	4 50	4 50	5 00	5 00	5 50	6 50	8 00	10 00	12 00	15 00
Reducers	1 20	1 50	2 00	2 75	2 75	3 00	3 00	3 50	4 00	8 00	10 00	12 00	15 00
Caps	80	1 10	1 30	1 60	1 60	2 00	2 00	2 15	2 35	4 00	4 35	6 00	7 25
Locknuts	50	70	95	1 25	1 25	1 35	1 35	1 50	1 90	2 50	3 50	4 00	4 50
Bushings	60	80	1 00	1 50	1 50	1 85	1 85	2 00	2 50	3 75	5 50	6 50	7 50
Plugs	50	75	85	1 35	1 35	1 75	1 75	2 00	2 40	3 75	5 50	6 50	7 50

For list on Galvanized Casing Fittings, double above list.
NOTE.—Casing fittings, with one or more openings pipe thread, add 25 per cent.

Fig. 4467

Fig. 4464

Fig. 4465

CAST IRON TWO-HOLE CASING BUSHINGS AND ONE AND TWO-HOLE CAPS

TAPPED FOR TWO-INCH PIPE

Size - - - - - - - - inches	5	5 3/16	5⅝	6¼	6⅝	7⅝	8¼	8⅝	9⅝
Bushings, fig. 4467	$3 25	3 50	3 75	5 75	6 00	6 50	8 50	9 00	10 50
Weight - - - - - - - lbs.	4	5	6	8	12	15	17	20	25
Caps, fig. 4464 & 4465	3 25	3 50	3 75	5 75	6 00	6 50	8 50	9 00	10 50
Weight - - - - - - - lbs.	6	9	13	14	18	24	28	32	42

WROUGHT IRON CASING BUSHINGS

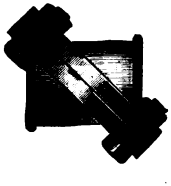
Size - - - - - - - - - - - - inches	5 3/16 x 5	5⅝ x 5	5⅝ x 5 3/16	6¼ x 5⅝	6⅝ x 6¼
Price - - - - - - - - - - - - - -	$4 75	5 00	5 00	6 50	7 75

Fig. 2988

BECKWITH SWING CHECK

Size - - - - - - - - - - - - - - - - - - inches	2	3	4
Regular - - - - - - - - - - - - - - - - - -	$4 75	12 00	25 00
Weight - - - - - - - - - - - - - - - - - lbs.	26	49	147
With lead gaskets - - - - - - - - - - - - - - -	8 00	15 00	32 00
Weight - - - - - - - - - - - - - - - - - lbs.	41	74	- - -

Fig. 4418



CUSHING'S PATENT FLANGE UNION

Size - - - - - inches	2	2½	3	3¾	4	5	6
Price - - - - - - -	$3 50	4 25	6 00	9 00	11 00	14 50	18 00
Weight - - - - - lbs.	7	12	26	44	67	80	101

WROUGHT IRON FITTINGS

Fig. 4433

Close

Fig. 4432

Long

Fig. 4431

Short

NIPPLES—Figs. 4431, 4432, 4433

THREADED RIGHT HAND

LENGTH IN INCHES			Sizes	PRICES		PRICES OF EXTRA LONG NIPPLES								
						Length in inches								
Close Fig. 4433	Short Fig. 4431	Long Fig. 4432		Close or Short	Long	4	5	6	7	8	9	10	11	12
¾	1½	2, 2½, 3, 3½	⅛	$0 04	06	07	08	10	12	14	15	17	18	19
⅞	1½	2, 2½, 3, 3½	¼	04	06	07	08	10	12	14	15	17	18	19
1	1½	2, 2½, 3, 3½	⅜	04	06	07	08	10	12	14	15	17	18	19
1⅛	1½	2, 2½, 3, 3½	½	05	07	08	10	12	14	16	18	20	22	23
1⅜	2	2½, 3, 3½, 4	¾	06	09	--	11	13	17	18	20	22	24	26
1½	2	2½, 3, 3½, 4	1	08	13	--	15	18	23	25	28	31	34	36
1⅝	2½	3, 3½, 4, 4½	1¼	11	17	--	20	24	29	33	36	40	44	47
1¾	2½	3, 3½, 4, 4½	1½	13	20	--	25	29	36	40	45	50	54	59
2	2½	3, 3½, 4, 4½	2	18	27	--	32	38	50	54	59	65	72	77
2½	3	3½, 4, 4½, 5	2½	39	59	--	--	68	90	97	1 06	1 17	1 26	1 35
2½	3	3½, 4, 4½, 5	3	48	72	--	--	85	1 08	1 20	1 33	1 45	1 58	1 70
2¾	4	4½, 5, 5½, 6	3½	75	1 05	--	--	--	1 30	1 45	1 60	1 75	1 90	2 05
3	4	4½, 5, 5½, 6	4	85	1 20	--	--	--	1 52	1 69	1 87	2 05	2 22	2 40
3	4	4½, 5, 5½, 6	4½	1 25	1 70	--	--	--	2 25	2 50	2 75	2 95	3 17	3 40
3½	4½	5, 5½, 6, 6½	5	1 55	2 45	--	--	--	2 58	2 83	3 10	3 35	3 60	3 85
3½	4½	5, 5½, 6, 6½	6	1 85	2 90	--	--	--	3 05	3 35	3 70	4 00	4 30	4 65
4	5	6	7	3 20	3 60	--	--	--	4 05	4 45	4 90	5 30	5 75	6 15
4	5	6	8	3 55	4 05	--	--	--	4 55	5 05	5 50	6 00	6 50	7 00
5	6	8	9	5 25	6 50	--	--	--	---	---	7 10	7 75	8 40	9 00
5	6	8	10	6 75	8 25	--	--	--	---	---	8 90	9 70	10 40	11 15
--	--	---------	11	----	-----	--	--	--	---	---	-----	-----	-----	-----
5	6	8	12	8 00	10 00	--	--	--	---	---	10 80	11 75	12 70	13 65

Nipples made to order from Extra Heavy Pipe at double the lists above.

CASING NIPPLES

Size - - - - - - inches	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Close or short - - - - -	$1 90	1 95	2 30	2 35	2 35	2 40	2 40	2 45	2 55
Long - - - - - - - - -	2 00	2 10	2 45	2 50	2 50	2 60	2 60	2 70	2 85
6 inches long - - - - -	2 05	----	----	----	----	----	----	----	----
7 inches long - - - - -	2 10	2 15	2 50	2 60	2 60	2 70	2 70	2 80	2 95
8 inches long - - - - -	2 15	2 20	2 60	2 65	2 75	2 80	2 80	2 95	3 10
9 inches long - - - - -	2 25	2 30	2 65	2 75	2 80	2 90	2 90	3 05	3 25
10 inches long - - - - -	2 30	2 35	2 70	2 85	2 90	3 00	3 00	3 15	3 40
11 inches long - - - - -	2 35	2 40	2 80	2 90	3 00	3 05	3 10	3 25	3 55
12 inches long - - - - -	2 40	2 50	2 85	3 00	3 10	3 15	3 20	3 35	3 65

Size - - - - - - inches	5 1⅜	5⅝	6¼	6⅝	7⅝	8¼	8⅝	9⅝	
Close or short - - - - -	$3 00	3 25	3 45	4 50	4 50	5 25	6 45	7 10	----
Long - - - - - - - - -	3 30	3 50	----	----	----	----	----	----	----
6 inches long - - - - -	----	----	3 80	4 80	4 75	5 45	----	----	----
7 inches long - - - - -	3 50	3 65	4 00	5 05	5 00	5 70	6 70	7 45	----
8 inches long - - - - -	3 65	3 80	4 20	5 30	5 25	5 95	7 00	7 80	....
9 inches long - - - - -	3 80	3 95	4 35	5 55	5 45	6 20	7 30	8 15	----
10 inches long - - - - -	4 00	4 10	4 55	5 80	5 70	6 45	7 60	8 50	----
11 inches long - - - - -	4 15	4 25	4 75	6 05	5 95	6 70	7 90	8 85	----
12 inches long - - - - -	4 30	4 40	4 95	6 30	6 20	6 95	8 20	9 20	----

Fig. 4435

Casing substitute nipples, or nipples made of line pipe or tubing, same list as above. Casing nipples over 12 inches long, charge net price of casing and two threads.

WROUGHT IRON SWEDGED NIPPLE

PIPE SIZES

Size - - inches	2x1	2x1¼	2x1½	2½x1½	2½x2	3x1	3x1½	3x2	3x2½	3½x2	3½x2½	3½x3
Price - - - - - -	$1 15	1 10	1 00	1 25	1 15	2 25	2 00	1 75	1 65	2 00	1 85	1 75
Weight - - lbs.	**3.6**	**3.6**	**3.6**	**5.7**	**5.7**	**7.5**	**7.5**	**7.5**	**7.5**	**9.0**	**9.0**	**9.0**

Size - - inches	4x1	4x2	4x2½	4x3	4x3½	4½x2	4½x2½	4½x3	4½x4	5x2	5x2½	5x3
Price - - - - - -	$3 75	2 75	2 50	2 25	2 15	3 00	2 85	2 75	2 50	4 00	3 75	3 50
Weight - - lbs.	**10.5**	**10.5**	**10.5**	**10.5**	**10.5**	**12.5**	**12.5**	**12.5**	**12.5**	**14.5**	**14.5**	**14.5**

Size - - inches	5x3½	5x4	5x4½	6x2	6x2½	6x3	6x3½	6x4	6x4½	6x5	7x4	7x5
Price - - - - - -	$3 35	3 25	3 00	5 50	5 25	5 10	5 00	4 75	4 50	4 25	6 75	6 50
Weight - - lbs.	**14.5**	**14.5**	**14.5**	**18.8**	**18.8**	**18.8**	**18.8**	**18.8**	**18.8**	**18.8**	**23.3**	**23.3**

Size - - - - - - inches	7x6	8x3	8x4	8x6	10x4	10x6	10x8	12x4	12x6	12x8	12x10
Price - - - - - - -	$6 00	8 50	8 25	7 50	15 00	13 50	12 00	22 00	20 00	18 25	16 75
Weight - - - - lbs.	**23.3**	**28.0**	**28.0**	**28.0**	**60.0**	**60.0**	**60.0**	**72.0**	**72.0**	**72.0**	**72.0**

CASING SIZES

Size, inches	Weight, lbs.	Each	Size, inches	Weight, lbs.	Each	Size, inches	Weight, lbs.	Each
4 x3	8	$4 00	5⅝ x4¼	12½	$5 00	6⅝ x3	17	$8 50
4¼ x2	8½	4 75	5⅝ x5	12½	5 50	6⅝ x4	17	8 00
5 x2	10	5 00	5⅝ x5 1⅜	12½	7 00	6⅝ x5	17	7 00
5 x3	10	4 50	6¼ x2	13½	6 00	6⅝ x5 1⅜	17	7 00
5 x3½	10	4 50	6¼ x3	13½	5 50	6⅝ x6¼	17	6 00
5 x4	10	4 00	6¼ x4	13½	5 50	8¼ x5	24	8 00
5 1⅜ x2	12½	6 50	6¼ x5	13½	5 25	8¼ x6¼	24	8 50
5 1⅜ x3	12½	5 50	6¼ x5 1⅜	13½	5 50	8¼ x6⅝	24	8 00
5 1⅜ x5	12½	4 00	6¼ x5⅝	13½	6 00	------	----	----
5⅝ x4	12½	4 50	6⅝ x2	17	15 00	- - -	- - -	----

PIPE CUTTING AND THREADING

Size - - - - - - - - - - inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Per thread, including cut - - - - - -	$0 06	06	06	06	10	10	15	15	20	35	35	45	50

Size - - - - - - - - - - inches	4½	5	6	7	8	9	10	12	14	15
Per thread, including cut - - - - -	$0 75	1 00	1 00	1 10	1 20	2 00	2 50	3 50	6 50	7 50

CASING AND DRIVE PIPE, CUTTING AND THREADING

Size - - - - - - - - - - inches	3 & 3¼	4¼ & 4½	5, 5 1/16 & 5⅝	6¼ & 6⅝
Per thread, including cut - - - - -	$0 35	50	1 00	1 15

Size - - - - - - - - - - inches	7¼ & 7⅝	8¼ & 8⅝	9⅝	8 D P	10 D P
Per thread, including cut - - - - - -	$1 75	2 50	3 50	2 50	3 50

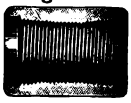
PIPE COUPLING

Fig. 4440

Size of pipe, inches	Outside diameter, inches	Length, inches	Weight, lbs.	Black, each	Galvanized, each	Right and left, black, each
⅛	13/32	1⅜	.031	$0 05	06	07
¼	17/32	1⅝	.046	05	06	07
⅜	27/32	1 1/16	.078	06	08	08
½	1	1 5/16	.124	07	10	11
¾	1 21/64	1 9/16	.25	10	13	15
1	1 1/16	1 13/16	.455	13	18	20
1¼	1 31/64	2⅛	.562	17	25	25
1½	2 7/32	2⅜	.8	21	32	30
2	2¾	2⅝	1.25	28	40	50
2½	3 9/32	2⅞	1.76	40	55	85
3	3 15/16	3⅛	2.63	60	80	1 20
3½	4 7/16	3⅜	4.	80	1 05	1 60
4	5	3⅝	4.13	1 00	1 40	2 00
4½	5½	3⅞	4.87	1 50	2 00	8 20
5	6 7/32	4⅛	8.44	1 65	2 25	9 00
6	7 5/16	4⅛	10.63	2 40	3 25	12 50
7	8 5/16	4⅛	11.27	3 25	4 20	13 00
8	9 5/16	4⅝	15.15	4 25	5 50	17 00
9	10⅜	5⅛	17.82	5 50	7 00	17 50
10	11 21/32	6⅛	27.7	7 50	9 75	23 00
12	13⅞	6⅛	43.18	10 00	13 65	28 00
13	15 1/16	6⅛	49.28	12 50	16 50	-----
14	16⅜	6⅛	63.27	18 75	23 85	-----
15	17⅞	6⅛	66.	25 00	30 25	-----

These tables are substantially correct but are subject to slight variations, which may be made without notice.

Fig. 4442



With sleeve

COUPLINGS

FOR TUBING, LINE PIPE, AND DRIVE PIPE

Fig. 4441

Size of tubing, inches	Outside diameter, inches	Length, inches	Weight, pounds	Plain, each	Galvanized, each	Plain, r. and l., each	Galvanized, r. and l., each
½	1 5/16	1 5/8	.29	$0 10	$0 14	$0 15	$0 21
¾	1 3/8	1 7/8	.41	12	16	18	25
1	1 5/8	2 1/8	.64	15	21	23	31
1¼	2 1/8	2 13/16	1.10	25	37	38	53
1½	2 3/8	2 13/16	1.18	30	46	45	63
2	2 9/16	3 1/4	2.5	40	57	70	98
2½	3 1/16	3 3/4	3.12	60	85	1 20	1 70
3	4 1/16	3 3/4	3.85	80	1 15	1 60	2 25
3½	4 9/16	4 1/8	5.	1 30	1 90	2 60	3 65
4	5 1/16	4 1/16	6.5	1 50	2 15	3 00	4 20
4½	5 9/16	4 1/16	7.7	2 00	2 85	7 75	9 15
5	6 1/16	4 5/8	11.21	2 40	3 45	8 50	10 50
6	7½	4 7/8	12.	2 80	4 00	9 75	12 00
7	8 1/16	6 1/8	14.75	3 85	5 55	10 00	12 75
8	9 1/16	6 1/8	23.25	4 00	5 80	11 50	15 75
9	10 1/16	6 1/8	26.48	5 00	7 25	12 00	16 75
10	11 7/8	6 1/8	29.50	6 00	8 75	14 75	20 25
12	13 7/8	6 1/8	39.5	8 00	11 15	18 25	25 50
13	15 1/16	6 1/8	46.	10 00	13 75	- - -	- - -
14	16 1/16	6 1/8	59.75	13 00	17 75	- - -	- - -
15	17¼	6 1/8	62.25	20 00	25 00	- - -	- - -

CASING COUPLING WITH SLEEVE

Nominal inside diam. casing, inches	Outside diameter, inches	Length, inches	Weight, pounds	Plain, each	Galvanized, each	R. & L., each.
2	2¾	2 9/16	1.31	$0 16	$0 23	$1 70
2¼	3	2 9/16	1.5	20	28	1 80
2½	3¼	2 5/8	1.62	25	35	2 00
2¾	3½	2 5/8	1.75	30	42	2 10
3	3 5/8	3 1/16	2.62	35	50	2 50
3¼	4	3 1/16	2.87	40	57	2 60
3½	4¼	3 1/16	3.06	46	65	3 00
3¾	4½	3 1/16	3.25	52	73	3 10
4	4¾	3 9/16	3.62	60	85	3 70
4¼	5	3 9/16	3.93	68	1 00	3 95
4½	5 7/16	3 9/16	4.06	74	1 05	4 55
4¾	5 5/8	3 9/16	4.93	80	1 15	4 85
5	5 13/16	3 9/16	5.68	90	1 30	5 25
5 1/16	6 1/16	3 9/16	5.93	1 00	1 40	5 50
5 5/8	6 5/8	4 1/8	6.37	1 20	1 70	6 10
6¼	7 9/16	4 1/8	7.93	1 35	1 90	6 45
6 5/8	7 11/16	4 1/8	9.68	1 50	2 15	7 10
7¼	8 1/16	4 1/8	9.93	1 65	2 35	7 55
7 5/8	8 9/16	4 7/8	14.	1 75	2 50	8 30
8¼	9 3/8	4 7/8	15.37	2 25	3 25	9 30
8 5/8	9 7/8	4 7/8	15.93	2 85	3 75	10 25
9 5/8	10 9/16	4 7/8	24.6	3 50	5 00	11 80
10 5/8	11 7/8	6 1/8	27.83	4 50	6 15	13 25
11 5/8	12 7/8	6 1/8	29.75	5 15	6 95	14 25
12½	14	6 1/8	35.	6 75	8 85	16 80
13½	15	6 1/8	42.5	7 60	10 15	18 65
14½	16 1/8	6 1/8	50.	8 75	11 75	21 00
15½	17 1/8	6 1/8	52.5	10 00	13 15	22 25

These tables are substantially correct but are subject to slight variations, which may be made without notice.

MERCHANT PIPE

BUTT AND LAP WELDED

BLACK AND GALVANIZED

Size, nominal inside diameter, inches	Price per foot	Nominal thickness, inches	Nominal weight per foot, lbs.	No. of threads per inch of screw
⅛	$0 05½	.068	.24	27
¼	05½	.088	.42	18
⅜	05½	.091	.56	18
½	08½	.109	.84	14
¾	11½	.113	1.12	14
1	16½	.134	1.67	11½
1¼	22½	.140	2.24	11½
1½	27	.145	2.68	11½
2	36	.154	3.61	11½
2½	57½	.204	5.74	8
3	75½	.217	7.54	8
3½	95	.226	9.00	8
4	1 08	.237	10.66	8
4½	1 30	.246	12.49	8
5	1 45	.259	14.50	8
6	1 88	.280	18.76	8
7	2 35	.301	23.27	8
8	2 82	.322	28.18	8
9	3 40	.344	33.70	8
10	4 25	.366	40.00	8
11	4 75	.375	45.00	8
12	5 20	.375	49.00	8
13	----	.375	54.00	8
14	----	.375	58.00	8
15	----	.375	62.00	8

No allowance made for pipe lighter than above weights.

Unless otherwise ordered, black pipe, random lengths, with threads and couplings, will be shipped.

For cut lengths an extra charge will be made above random lengths.

For pipe smoothed on the inside, known as plugged and reamed, an extra charge will be made above regular pipe.

For galvanized pipe an extra charge will be made above black.

For asphalted pipe an extra charge will be made above black.

LARGE O. D. PIPE

PLAIN ENDS

Revised and adopted May 1, 1902

Size, O. D.	¼-inch thick	5/16-inch thick	⅜-inch thick	7/16-inch thick	½-inch thick
14	$3 85	4.80	5.75	6.65	7.60
15	4 15	5.15	6.15	7.15	8.15
16	4 40	5.50	6.60	7.65	8.70
17	4 70	5.85	7.00	8.15	9.25
18	4 95	6.20	7.40	8.60	9.80
20	5 50	6.90	8.25	9.60	10.95
21	-----	7.25	8.65	10.10	11.50
22	-----	7.60	9.10	10.60	12.10
24	-----	----	9.95	11.60	13.15
26	-----	----	11.30	13.15	14,95
28	-----	----	12.15	14.15	16.15
30	-----	----	----	15.20	17.65

This pipe will be shipped in random lengths, plain ends, unless otherwise ordered.

For cut lengths an extra charge above random will be made.

For threaded pipe an extra charge above plain end will be made.

We can thread up to 22 inches. We can thread and couple up to 20 inches.

DRIVE PIPE

DIAMETER, INCHES		Nominal weight per foot, lbs.	Thickness, inches	Number threads per inch	Outside diameter of couplings, inches	Per foot
Nominal, inside	Actual, outside					
3	3½	7.54	.217	8	4 1/16	Prices subject to market changes.
4	4½	10.66	.237	8	5 5/16	
6	6⅝	18.76	.280	8	7½	
8	8⅝	28.18	.322	8	9 9/16	
- - -	- - -	32	- - -	8	- - -	
10	10¾	40.06	.366	8	11⅞	
12	12¾	49	.375	8	13⅞	
14	- - -	58	.375	8	16 5/16	

LINE PIPE

DIAMETER, INCHES		Nominal weight per foot, lbs.	Thickness, inches	Number threads per inch	Outside diameter of couplings, inches	Per foot
Nominal, inside	Actual, outside					
2	2.375	3.61	.154	11½	2 3/32	Prices subject to market changes.
2½	2.875	5.74	.204	11½ and 8	3 5/32	
3	3.5	7.54	.217	11½ and 8	4 1/16	
3½	4	9	.226	11½ and 8	4 23/32	
4	4.5	10.66	.237	10 and 8	5 5/16	
4½	5	12.49	.246	8	5 23/32	
5	5.563	14.50	.259	8	6 1/32	
6	6.625	18.76	.280	8	7½	
7	7.625	23.27	.301	8	8 5/32	
8	8.625	28.18	.322	8	9 9/16	
8	8.625	25	.281	8	9 9/16	
10	10.75	40.06	.366	8	11⅞	
10	10.75	35	.3145	8	11⅞	
12	12.75	49	.375	8	13⅞	

TUBING

DIAMETER, INCHES		Nominal weight per foot, lbs.	Thickness, inches	Number threads per inch	Outside diameter of couplings inches	Per foot
Nominal, inside	Actual, outside					
1	1.315	1.67	.134	11½	1 5/16	Prices subject to market changes.
1¼	1.66	2.24	.140	11½	2 1/16	
1½	1.9	2.68	.145	11½	2 3/16	
2	2.375	4.5	.1935	11½	2 31/32	
2	2.375	4	.1725	11½	2 31/32	
2½	2.875	5.74	.204	11½	3 5/32	
3	3.5	7.54	.217	11½	4 1/16	
3½	4	9	.226	11½	4 23/32	
4	4.5	10.66	.237	10	5 5/16	
6	6.625	18.76	.280	8	7½	

Flush joint drive pipe, line pipe, or tubing of any of the sizes mentioned, to order.

Fig. 1505

LAP-WELDED CASING

WITH COUPLING JOINT

DIAMETER, INCHES			Nominal weight per foot	Thickness, inches	No. of Threads per inch	Outside diameter of couplings, inches	Price per foot
Nominal	Internal	External					
2	2.06	2 1/4	2.22	.095	14	2 3/4	$0 23
2 1/4	2.282	2 1/2	2.82	.109	14	3	29
2 1/2	2.532	2 3/4	3.13	.109	14	3 1/4	32
2 3/4	2.782	3	3.45	.109	14	3 1/2	35
3	3.01	3 1/4	4.10	.120	14	3 25/32	41
3 1/4	3.26	3 1/2	4.45	.120	14	4	45
3 1/2	3.51	3 3/4	4.78	.120	14	4 1/4	48
3 3/4	3 732	4	5.56	.134	14	4 1/2	56
4	3.982	4 1/4	6.00	.134	14	4 3/4	60
4 1/4	4.218	4 1/2	6.36	.141	14	5	64
4 1/4	4.094	4 1/2	9.38	.203	14	5	1 00
4 1/2	4.468	4 3/4	6.73	.141	14	5 7/32	68
4 1/2	4.344	4 3/4	9.39	.203	14	5 7/32	1 00
4 3/4	4.704	5	7.80	.148	14	5 5/8	78
5	4.954	5 1/4	8.20	.148	14	5 13/16	82
5	4.867	5 1/4	9.86	.191	14	5 13/16	1 00
5	4.753	5 1/4	12.80	.248	11 1/2	5 13/16	1 30
5	4.65	5 1/4	15.88	.300	11 1/2	5 13/16	1 50
5 3/16	5.187	5 1/2	8.62	.156	14	6 1/16	87
5 3/16	5.042	5 1/2	12.49	.229	11 1/2	6 1/16	1 30
5 5/8	5.688	6	10.46	.156	14	6 5/8	1 05
5 5/8	5 594	6	12.04	.203	11 1/2	6 5/8	1 20
5 5/8	5.560	6	14.20	.220	11 1/2	6 5/8	1 40
5 5/8	5.457	6	16.70	.271	11 1/2	6 5/8	1 60
6 1/4	6.280	6 5/8	11.58	.172	14	7 9/32	1 16
6 1/4	6.219	6 5/8	13.32	.203	14-11 1/2	7 9/32	1 35
6 1/4	6.149	6 5/8	17.02	.238	11 1/2	7 9/32	1 70
6 5/8	6.640	7	12.34	.180	14	7 1/16	1 24
6 5/8	6.503	7	17.51	.248	11 1/2-10	7 1/16	1 75
7 1/4	7.265	7 5/8	13.55	.180	14	8 1/16	1 36
7 5/8	7.617	8	15.41	.191	11 1/2	8 23/32	1 55
7 5/8	7.482	8	20.17	.259	11 1/2	8 23/32	2 10
8 1/4	8.265	8 5/8	16.07	.180	11 1/2	9 3/8	1 61
8 1/4	8.167	8 5/8	20.10	.229	11 1/2	9 3/8	2 00
8 1/4	8.082	8 5/8	24.38	.271	11 1/2-8	9 3/8	2 40
8 5/8	8.640	9	17.60	.180	11 1/2	9 7/8	1 76
9 5/8	9.577	10	21.90	.211	11 1/2	10 29/32	2 20
10 5/8	10.594	11	26.72	.203	11 1/2	11 7/8	2 68
11 5/8	11.594	12	30.35	.203	11 1/2	12 7/8	3 05
12 1/2	12.457	13	33.78	.271	11 1/2	14	3 38
13 1/2	13.432	14	42.02	.284	11 1/2	15	----
14 1/2	14.416	15	47.66	.292	11 1/2	16 1/8	----
15 1/2	15.416	16	51.47	.292	11 1/2	17 1/8	----

The Sleeve Coupling is used on casing, line pipe and tubing. The threads on the tube and in the coupling are cut to the same taper. The sleeve protects the threads of the couplings and guides the end of the tube. The last thread on the tube is nearly as deep as the first, and the tube is weakest and most liable to break at the last thread.

GALVANIZED CASING

Per pound extra, net - $----

LINE PIPE, TUBING, AND CASING

SLEEVE COUPLING FOR TUBING OR LINE PIPE

Fig. 1510

Taper threads

The sleeve coupling is used on casing, line pipe, and tubing. The threads on the tube and in the coupling are cut on a taper. The sleeve protects the threads of the couplings and guides the end of the tube.

Tubing furnished with the joint patented February 21, 1899, overcomes a difficulty that has never before been accomplished, viz., a joint that prevents vibration in the threads, removing all liability of breaking at the threads, and dropping.

The couplings are 5 inches long, with a sleeve at each end 1 inch long, turned to an exact gauge.

The outside of the tubing on which this coupling is to be placed is $\frac{3}{32}$ inch larger than the regular size.

Above the threads the tubing is turned off 1 inch in width, to an exact gauge, the result being that when the tubing is screwed into the coupling the threads fit into each other the entire length, and the turned parts, fitting closely (metal to metal), make an absolutely tight and perfect joint.

No vibration can reach the threads. They are only required to sustain the weight.

If the tubing has to be cut and rethreaded, the metal beyond the threads, for 1 inch in width, must be filed off to fit the sleeve in the coupling. This can be done in a few moments.

Unless filed off beyond the threads, it will be impossible for the threads to enter far enough into the coupling to make a proper joint.

PATENT TUBING JOINT

Fig. 1511

(Patented Feb. 21, 1899.)

Taper threads

Threads, both on the tubing and in the coupling, are made to a taper of $\frac{3}{4}$ inch to the foot, consequently they fit closely into each other the entire length.

The threads in the coupling and on the tubing are standard. Any fitting can be used with either.

The tubing is made of the best material, weighs 4½ lbs. to the foot, is hammer tested under 2,500 lbs. pressure, and carefully inspected.

DRIVE PIPE AND FLUSH JOINT PIPE

Threads on drive pipe are straight, and the ends meet or "butt" in the center of the coupling. This pipe will stand heavy driving.

Flush joint drive pipe, tubing, or pipe is made by cutting away portions of the tubes and putting threads thereon. The pipe has the same inside and outside diameters at the joint as at other places, so that it is perfectly flush both inside and out.

A larger size of flush joint pipe can be used in wells than of pipe with couplings, but it is not so strong.

Flush joint pipe can be driven if care is used, but for driving purposes it is better to make it of extra strong pipe.

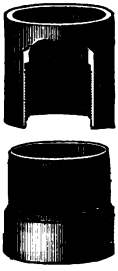
DRIVE PIPE, COUPLING JOINT

Fig. 1500

Straight threads

FLUSH JOINT PIPE

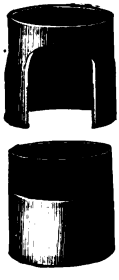
Fig. 1501



Can be driven if light blows are carefully given

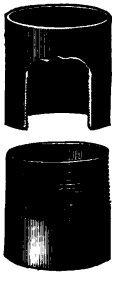
INSERTED JOINT

Fig. 1506



FLUSH JOINT

Fig. 1507



INSERTED AND FLUSH JOINT CASING

Inserted joint casing and flush joint casing are sometimes used in oil and gas wells instead of flush joint pipe, being lighter and having more inside space for the tools. It should not be driven.

The "inserted joint casing" is made by cutting a thread on one end and expanding the other and cutting in it an interior thread, so that the end of one piece screws into the end of another.

"Flush joint casing" is made by cutting interior and exterior taper threads on respective ends of the pipe, so that the end of one piece will screw into the other. This joint is not strong, and the casing must be used with great care.

PIPE TRADE CUSTOMS

Every piece of pipe, tubing, casing, line pipe, drive pipe and boiler tube, is carefully examined and tested, but as it is impossible to always detect imperfections, the only guarantee that is ever given is to replace such goods as prove defective. Under no circumstances is the seller responsible for any damages beyond the price of the goods. No charges for labor or expenses required to repair defective goods or occasioned by them will be allowed. If goods are defective, the measure of damages is the price of the defective pieces.

To equalize the prices in different places, goods are sometimes sold "freight allowed to destination" or with a mentioned freight allowance, but this freight allowance is only a discount on the price and is not a contract for delivery; the shipper's responsibility ends when goods are delivered to the transportation company.

For goods lost or damaged in transit, buyers must look to the carrier only.

Shipments by land, river or lake, will be insured only when buyers so instruct.

Ocean shipments are insured for the benefit of consignee and the premium is charged. If buyers do not desire such insurance they should so advise with the order.

Claims for shortage or deductions for erroneous charges must be promptly presented or will not be allowed. Special goods made to specification, where buyer is to inspect, must be inspected and accepted before shipment is made. After shipment is made our responsibility ceases.

Requests for cancellation of orders, calling for odd sizes or cut lengths, will not be considered, if the manufacture of the material has been commenced when the request reaches the mill.

Ordinary merchant pipe is sold in randum lengths with threads on both ends and with a coupling on one end of each piece.

X strong, XX strong and hydraulic pipe are sold without threads or couplings, unless threads and couplings are specified, and then an additional charge is made for such threads and couplings.

An extra charge is always made for pipe cut to special lengths.

Pipe "cut to order" is threaded at each end; but no couplings are furnished. If couplings are desired they must be ordered and an extra charge will be made for them.

When pipe is ordered cut to a particular length "with coupling," a coupling is screwed on one end and is measured in the length.

There is no such thing known in the trade as "Double Thick Pipe." When pipe heavier than standard is required, either X strong, XX strong or hydraulic should be ordered, and the thickness of hydraulic pipe must be specified.

Standard weight Casing (the lightest weight) is always furnished on orders unless another weight is specified.

The outside diameter of goods heavier than "Standard" is the same as "Standard," the extra thickness being on the inside, so that the different weights of the same size use the same couplings.

Sheet iron thread protectors are not charged.

Wrought iron thread protectors on line pipe are charged, but if returned, credit will be given at prices charged.

Boiler tubes are sold cut to length without extra charge for cutting.

Boiler tubes are rated by their outside diameter; all other pipe by the nominal inside diameter, but goods heavier than "Standards" are less in actual diameter than in nominal diameter.

Quotations are for immediate acceptance.

Prices are subject to change without notice.

All pipe orders are accepted by manufacturers subject to strikes, accidents and other unavoidable delays.

The time of delivery is never of the essence of a pipe contract.

When shipments are made consigned to our own order, such shipments are for the accommodation of the buyer and are subject to the same rules as if made to the buyer. That is to say, all damages and all losses in transportation must be borne by the buyer. The shipper's claim against the transportation company, if any, will be assigned to the buyer without recourse.

MANILA ROPE FOR WELLS

Fig. 1528

Drilling cable, hawser laid

Fig. 1527

Bull rope, plain laid

PLAIN LAID

½ inch and larger	Base Price
⅜ inch Rope, advance per pound	$0 00½
¼ and $\frac{5}{16}$ inch rope, advance per pound	01
$\frac{7}{16}$ inch rope, advance per pound	01½

Add one cent per pound when cut to order.

BOLT CABLES

Cables made from selected Manila fiber, otherwise known as Bolt Ropes, advance over regular cables, per pound ---------- $0 02

Drilling cable sizes, 2½, 2¼, 2⅛, 2, 1⅞, 1¾, and 1½ inches, fig. 1528.
Sand pump lines, sizes 1⅛, 1, ⅞, ¾, ⅝, and ½ inches, fig. 1528.
Tubing lines, sizes, 2½, 2¼, 2⅛, 2, 1⅞ and 1¾ inches, fig. 1528.
Sucker rod lines, sizes, 1¾, 1⅝, 1½, and 1¼ inches, fig. 1528.
Bull ropes, sizes, 3, 2¾, 2½, 2¼, 2⅛, and 2 inches, fig. 1527.

DIAMETERS AND APPROXIMATE WEIGHTS

HAWSER LAID ROPES

Size - - - - - - - inches	½	⅝	¾	⅞	1	1⅛	1¼	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2½
Drilling cables, **weight - lbs.**	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{3}{4}$	1	$1\frac{1}{5}$	$1\frac{1}{3}$	$1\frac{2}{5}$	$1\frac{2}{3}$	$1\frac{9}{10}$	$2\frac{1}{8}$
Sucker rod lines, **weight - lbs.**	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{3}{4}$	1	$1\frac{1}{5}$	--	--	--	--	--
Sand pump lines, **weight - lbs.**	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{3}{5}$	--	--	--	--	--	--	--	--

PLAIN LAID

Size - - - - - - - inches	½	⅝	¾	⅞	1	1⅛	1¼	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2½
Weight - - - - - - - lbs.	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{15}{32}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{6}$	$1\frac{1}{4}$	$1\frac{1}{3}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$2\frac{1}{8}$

DIAMETER AND APPROXIMATE WEIGHTS OF BULL ROPE, Fig. 1527

Size - inches	2	2⅛	2¼	2½	2¾	3
Approximate weight, per foot - - - - - - - - - - - - lbs.	$1\frac{1}{3}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$	3

All manila cordage is sold by weight. Price per pound subject to market quotations.

STEEL WIRE ROPES—see page 132.

BULL ROPE COUPLINGS

Fig. 2258

Fig. 2260

Common, 2⅛ and 2¼ inch, fig. 2258. **Weight, 6 lbs.** - - - - - - - - - each, $0 80
Common, 2½ and 2¾ inch, fig. 2258. **Weight, 7 lbs.** - - - - - - - - - each, 1 10
Common, 3inch, extra heavy, fig, 2258. **Weight, 10 lbs.** - - - - - - - - each, 2 50
Rogers' patent, fig. 2260 - each, 1 75

WIRE ROPE FOR WELLS

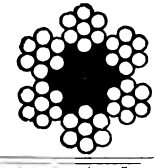
Fig. 1526

SAND LINE

Made from special cast steel wire of a high tensile strength, combined with toughness and extra wearing qualities. Each wire is carefully tested to insure uniformity and durability.

Sand lines, all sizes; are composed of 6 strands of 7 wires each, or 42 wires in all, laid around a hemp center.

Fig. 1526-A



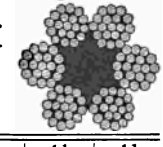
Size - - - - - - - - - - - - - - - - - - inches	3/8	7/16	1/2	9/16	5/8
Weight, per foot - - - - - - - - - - - - - - - lbs.	.22	.30	.39	.50	**.62**
Breaking strain in tons of 2,000 pounds - - - - - -	4.8	6.6	8.4	10	13
Proper working loads in tons of 2,000 pounds - - - -	1	1 1/3	1 3/4	2 1/4	2 1/2
Per foot - - - - - - - - - - - - - - - - - -	$0 05 1/2	06 1/2	07 1/2	09	11

Fig. 1533

TUBING AND CASING LINES

Are composed of 6 strands of 19 wires each, or 114 wires in all, laid around a hemp center. These are more pliable than the ropes used for sand line purposes.

Fig. 1533-A



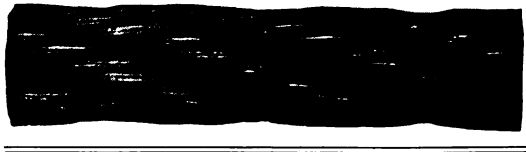
Size - - - - - - - - - - - - - - - - - inches	5/8	3/4	7/8	1	1 1/8	1 1/4
Breaking strain in tons of 2,000 pounds - - -	13.6	19.4	26.	34.	42.	50.
Proper working loads in tons of 2,000 pounds -	2 3/4	3 3/4	5 1/4	6 3/4	8 1/2	10
Approximate weight, per foot - - - - - lbs.	**.62**	**.89**	**1.20**	**1.58**	**2.00**	**2.50**
Per foot - - - - - - - - - - - - - - - -	$0 14	18	23	30	38	46

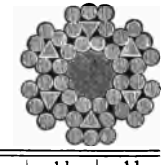
WIRE SUCKER ROD LINE, LEFT TWIST

Size - inches	3/8	1/2
Made of 6 strands of 19 wires each, crucible cast steel, per foot - - -	$0 09 1/2	11
Made of 6 strands of 25 wires each, crucible steel, patent flattened strand, per foot -	- - -	14 1/2

LESCHEN'S PATENT FLATTENED STRAND DRILLING ROPE

Fig. 1534



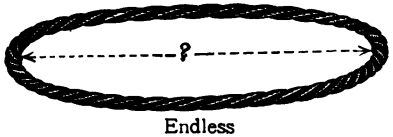


Size - - - - - - - - - - inches	1/4	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
Approximate weight, per foot, lbs.	**.25**	**.40**	**.68**	**.93**	**1.20**	**1.64**	**2.00**	**2.40**
Per foot - - - - - - - - - -	$0 07	10	14	20 1/2	27 1/2	35	45	54
Hawser laid drilling cables for cleaning out wells - - - - -	- - -	- - -	- - -	19 1/2	26 1/2	34	- - -	- - -

STEEL WIRE DEAD LINES

The wire dead line is used to attach snatch block to crown block, thus distributing strain over top of derrick.

Fig. 1546 A



Endless

In ordering make sketch as above giving length when doubled.

Fig. 1547

Single

In ordering specify length over all; also size of loop at each end.

	Endless, Fig. 1546A					Single, Fig. 1547				
Diameter, inches -	⅞	1	1⅛	1¼	1½	⅞	1	1⅛	1¼	1½
Weight per 100 ft. lbs.	120	158	200	245	355	120	158	200	245	355
Extra length required for splicing, feet - - - - -	10	10	12	12	12	10	10	12	12	12
Per foot - - - -	$0 23	$0 30	$0 38	$0 46	$0 66	$0 23	$0 30	$0 38	$0 46	$0 66
Extra for splicing -	4 00	4 00	4 00	4 50	4 50	4 00	4 00	4 00	4 50	4 50

GALVANIZED THIMBLE FOR WIRE ROPE

Fig. 1535

Diameter of rope	Price	Diameter of rope	Price	Diameter of rope	Price
¼	$0 08	⅝	13	1⅛	28
5/16	08	¾	15	1¼	33
⅜	09	7/8	16	1⅜	42
7/16	10	1	20	1½	50
½	11	----	----	----	----

WIRE ROPE SOCKETS

Fig. 1536

Closed

Fig. 1537

Open

Diameter - - - - inches	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1⅛	1¼
Closed, loose - - - - - -	$0 70	85	85	1 10	1 10	1 35	1 65	1 85	2 40	3 30	4 50
Closed, fastened - - - - -	1 60	1 85	2 00	2 25	2 35	2 65	3 15	3 85	4 65	6 15	8 00
Open, loose - - - - - -	85	1 00	1 00	1 35	1 35	1 65	2 10	2 50	3 15	4 50	6 10
Open, fastened - - - - -	1 75	2 00	2 15	2 50	2 60	2 95	3 60	4 50	5 40	7 35	9 60

For special tools, used in connection with wire ropes for drilling, see pages 138, 140, 141, 152.

WELL DRILLING TOOLS

Fig. 1265

Interior view of derrick, showing workmen dressing tools, location of forge, bellows, anvil, etc.

A DRILLING OR BORING PLANT FOR THE STANDARD CABLE SYSTEM

In use throughout the American oil fields involves certain factors which may vary to suit local requirements, but under any condition must comprise:

A derrick or rig - see pages 6 to 50
Boiler and engine - see pages 71 to 102
Drilling tools and accessories - - - - - - - - - - - - - - - - see pages 134 to 185
Drilling cable and sand line - - - - - - - - - - - - - - - - - see pages 131 & 132
Blacksmiths' tools - see pages 277 & 279

WOOD CONDUCTOR

Fig. 2285

Size - - - - - - - - - - inches	8	10	12	13	14
Per foot - - - - - - - - - - - -	$0 25	40	50	55	60
K. D. - - - - - - - - - - per foot	20	30	40	45	50

THE FOLLOWING LIST IS AN EXAMPLE OF A SIMPLE STANDARD OUTFIT

(RIG NOT INCLUDED)

ARTICLES	Weight, lbs.
1 boiler, 20 H.P.	5,800
1 engine, 20 H.P.	4,000
1 belt, 10 in., 5-ply, 90 ft.	140
1 drilling cable, 2 in. x 1,500 ft.	2,143
1 wire sand line, $\frac{7}{16}$ in. x 1,500 ft.	470
1 bull rope, 2 in. x 85 ft.	115
1 telegraph cord	3
1 temper screw, $1\frac{3}{4}$ in. with $1\frac{1}{2}$ in. lower parts	270
1 New Era rope socket, $2\frac{1}{4}$ in. x $3\frac{1}{4}$ in.-7	125
1 set jars, $5\frac{1}{4}$ in. diam., $2\frac{1}{4}$ in. x $3\frac{1}{4}$ in.-7	300
1 auger stem, $3\frac{1}{4}$ in. x 36 ft., $2\frac{1}{4}$ in. x $3\frac{1}{4}$ in.-7	1,400
1 spudding bit, 13 in.-80 lb. steel	300
2 sets drilling bits, 8 in., 6 in.	1,100
2 tool gauges, 8 in., 6 in.	17

ARTICLES	Weight, lbs.
1 set tool wrenches	450
1 Barrett jack, No. 1	209
1 40 in. bellows	150
1 150-lb. anvil	150
2 14-lb. sledges, with handles	32
1 ball peen hammer, No. 71	2
1 pair blacksmith tongs	5
1 tubing or casing line, 2 in. x 240 ft.	340
1 set Fairs mall. elevators, $5\frac{5}{8}$ in.	70
1 single snatch block, 20 in.	54
1 single snatch block hook	50
1 Chickering sand pump, 4 in., for $5\frac{5}{8}$ in.	80
1 Morahan sand pump, $5\frac{5}{8}$ in., for 8 in.	140
1 wrought iron bailer, 5 in.	175
1 horn socket	125

Total estimated weight, 18,215 pounds.

The estimated value of the foregoing is $1,625.00, loaded on cars at Pittsburgh. The outfit is adapted to ordinary rock formations, and is capable of drilling twelve to fourteen hundred feet or deeper by the substitution of longer cable and sand line.

It should be observed, however, that the list contains only the absolute necessities, and no provision is made for difficult formations, or for "fishing jobs."

When our correspondents desire us to recommend suitable outfits, we will undertake to do so when furnished with following data:

First—Location. As we have supplied outfits to nearly all habitable parts of the globe, our records will frequently assist in a proper selection of outfit when exact location is known.

Second—What is the extreme depth required?

Third—Distance from surface to first rock.

Fourth—Are there underlying beds of sand or other very soft formations?

Fifth—Is there ample water supply for feeding boiler and for hydraulic rotary?

Sixth—Is timber available for building rig and derrick?

Seventh—Is fuel abundant? and of what character—coal, wood, gas or oil?

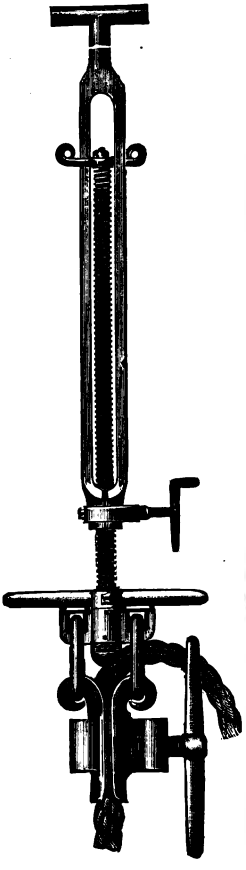
WELL DRILLING TOOLS FOR CABLE SYSTEM

TEMPER SCREWS AND PARTS

HEAVY PATTERN
Fig. 1554

REGULAR PATTERN

WITH TEE
Fig. 1553



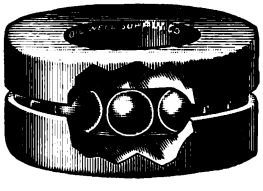
WITH EYE
Fig. 1550

WITH BOX AT EACH END
Fig. 1569

Patented

CONE ROLLER BEARING
Fig. 1573

BALL BEARING
Fig. 1563



PRICES OF TEMPER SCREWS

WITH B. B. WASHERS, TOP AND BOTTOM, AND PARTS

COMPLETE				REGULAR PATTERN Figs. 1553-1550						HEAVY PATTERN Fig. 1554			
Size of screw - inches				1½		1¾		1¾		1¾		2	
T or eye to let out, feet	inches	Total length of screw, feet	inches	Price	Weight lbs.	Price	Weight lbs.	With 1½ lower parts, price	Weight lbs.	Price	Weight lbs.	Price	Weight lbs.
4	0	5	4	$40 00	224	$45 00	245	$42 50	233	------	------	------	----
4	7	6	0	41 00	232	46 00	256	43 50	244	$52 50	285	------	----
5	0	6	6	------	----	47 50	267	45 00	255	55 00	296	------	----
5	6	7	0	------	----	50 00	----	------	----	57 50	307	------	----
6	0	7	6	------	----	52 50	----	------	----	60 00	318	------	----
4	4	6	0	------	----	------	----	------	----	------	------	$60 00	317
4	10	6	6	------	----	------	----	------	----	------	------	62 50	330
5	4	7	0	------	----	------	----	------	----	------	------	65 00	343
5	10	7	6	------	----	------	----	------	----	------	------	67 50	356
For cone bearing washers add to list						50	----	50	----	50	------	75	----

If fitted with interchangeable box (Fig. 1559, page 139), add to list $9.00

PARTS (See Fig. 1554, page 136)	REGULAR PATTERN		HEAVY PATTERN	
Size of screw for - inches	1½	1¾	1¾	2
A—Frame with T, for screw 5 feet 4 inches	$12 00	12 50	13 50	------
A—Frame with T, for screw 6 feet 0 inches	12 50	13 00	14 00	18 50
A—Frame with T, for screw 6 feet 6 inches	13 00	13 50	14 50	20 00
A—Frame with T, for screw 7 feet 0 inches	------	------	15 00	21 50
A—Frame with T, for screw 7 feet 6 inches	------	------	15 75	22 50
B—Main screw, 5 feet 4 inches long	3 90	4 75	4 75	------
B—Main screw, 6 feet 0 inches long	4 00	4 90	4 90	5 75
B—Main screw, 6 feet 6 inches long	4 20	5 10	5 10	6 00
B—Main screw, 7 feet 0 inches long	------	------	5 30	6 50
B—Main screw, 7 feet 6 inches long	------	------	5 50	7 00
C—Nut for main screw	10	10	10	10
D—Upper ball bearing, complete	75	75	75	75
E—Lower ball bearing, complete	1 50	1 50	1 50	2 50
Balls, only	05	05	05	05
Cone bearing, complete	------	2 50	2 50	4 00
Cones, only	------	10	10	10
Washers, only (copper)	25	30	30	40
Washers, only (steel)	10	15	15	20
F—Elevator	1 25	1 25	1 25	1 50
G—Yoke	1 75	1 75	1 75	1 75
H—T screw for yoke	1 25	1 25	1 25	1 25
I—Yoke set screws, each	10	10	10	10
J—Cross bar	1 75	1 75	2 00	3 00
K—Cross bar set screws, each	10	10	10	10
L—Mack's patent swivel	4 50	4 50	5 50	5 50
M—Mack's patent link seat	30	30	40	40
N—Link seat cap or plate	15	15	15	15
O—C chain connection, complete	------	2 50	2 50	2 50
P—Clamp links, per pair	1 50	1 50	1 50	1 50
Q—Rope clamps, per set	5 00	6 00	6 50	6 50
R—C, only	3 75	5 50	6 00	6 00
S—C screw with handle, solid	3 25	3 25	3 75	3 75

Frame with box at each end, for 6-foot screw	$22 50
Frame with box at each end, for 6-foot 6-inch screw	23 00
Frame with box at each end, for 7-foot screw	24 00
Plugs	4 50
Interchangeable boxes (Fig. 1559, page 139), each	9 00

WELL DRILLING TOOLS

FOR CABLE SYSTEM

TEMPER SCREW CLAMPS FOR DRILLING WITH WIRE ROPE

MACK'S PATENT

Fig. 1576

Weight 102 lbs.
Price - - - - - $36 00

RIGBY'S PATENT

Fig. 1576-A

Weight 125 lbs.
Price - - - - $50 00

CALIFORNIA STYLE

Fig. 1576-C

Weight 115 lbs.
Price - - - $25 00

WOODSFIELD STYLE

Fig. 1576-D

Fig. 1576-D
Weight 115 lbs.
Price - - - $65 00

SEELEY

Fig. 1576-E

Fig. 1576-E
Weight 115 lbs.
Price - - - $36 00

A full description of cables will be found on pages 131-132.

Drilling cables have been made of manila fiber almost exclusively until the past few years. This material is well adapted to the purpose, owing to its strength and elasticity.

Cables of steel wire are gradually finding favor, especially for "cleaning out" or increasing the depth of completed wells.

The steel cables require special temper screw clamps and rope sockets. We recommend the Mack's patent temper screw clamps and the O. W. S. patent rope socket.

Unless otherwise specified, attachments for manila cable are always furnished.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

SPEARBECK TEMPER SCREW CLAMP FOR MANILA ROPE
Fig. 1570

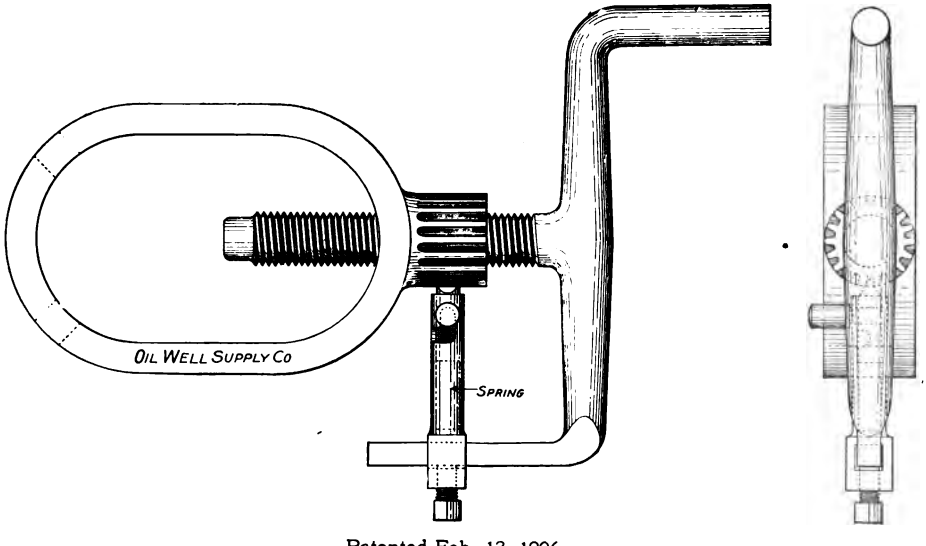
Weight 120 lbs.
Price - - - - - - - - - $36 00

INTERCHANGEABLE TEMPER SCREW BOX
Fig. 1559

For list see page 137

"HOLD FAST" TEE SCREW FOR TEMPER SCREW

Fig. 1560

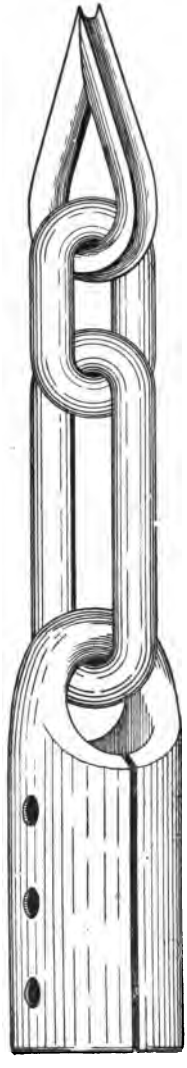


Patented Feb. 13, 1906.

SMITH'S WIRE ROPE CONNECTION

CONNECTION

Fig. 1598



Patented

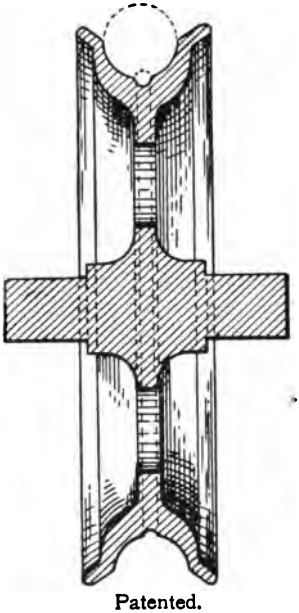
Wire Drilling Cable is rapidly coming into use and this connection seems to overcome the difficulties heretofore encountered on account of the lack of stretch or elasticity in the Wire Rope.

It is customary to use from 150 to 200 feet of Manila Line next to the tools, thus providing ample elasticity.

It is necessary to use a special Crown Pulley with this attachment. The Pulley is provided with a wide groove to carry the connection. This groove is narrowed towards the base to carry the Manila Line and has a shallow trough in the base to carry the Wire Line.

SPECIAL CROWN PULLEY

Fig. 2243



Patented.

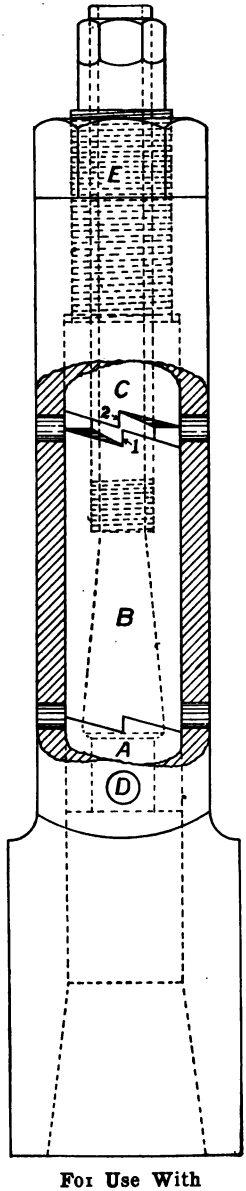
Smith's Patent Wire Rope Connection - - - - - -	Each	$17 50
Special Crown Pulley, (weight 430 lbs.) - - - - -	"	26 00

FISHING SOCKET

TO TAKE HOLD OF THE CONNECTION WHEN LOST IN WELL

Size - - - - - - - - - - - - - - - - inches	5⅝	6¼	6⅝	8¼
Price - - - - - - - - - - - - - - - - - -	$60 00	65 00	65 00	87 00

THE ONLY RELIABLE ROTARY ROPE SOCKET
Fig. 1577 C



For Use With Wire Drilling Cable

THE O. W. S. CO. ROTARY SOCKET

PATENTED JUNE 9, 1903

The illustration shows the Socket in sectional form. As the Drilling Cable receives the weight of the tools the upper clutch engages. The weight of the tools causes the cable to unlay or unwind, which changes their radial position while in elevation. As soon as the tools reach the position where the cable is relieved of their weight it springs back carrying the swivel block "B" with it one quarter turn or until lower clutch is engaged. The upper clutch is now ready to engage on receiving the weight of the tools. Thus on every stroke of the walking beam the tools are in a different position, being one quarter of a revolution in advance of the previous stroke.

DIRECTIONS

To connect Socket to cable remove lower block "A" by taking out pin "D." Withdraw swivel block "B," insert cable through hood and connect in swivel block "B" by turning ends of cable back and babbitting. Replace parts and be sure that adjustment is proper for swivel block "B" to unwind one quarter turn when weight of tools is relieved from cable. To make test, drop tools on wrench. If adjustment is needed screw top clutch block "C" to proper position as shown in cut; i. e., with face "1" slightly in advance of face "2" and points slightly apart. Secure thoroughly by jam nut "E."

Prices on application.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

TOOL WRENCHES

Two in a set, right and left hand

Fig. 1620

Form of wrench, 175 lbs. and lighter
(Lifting handle not shown)

Fig. 1617

Form of wrench, 200 lbs. and heavier

Size of square, inches	2½	2¾	3¼	3¾	3½	3½	4	4	4	4
Weight, each - lbs.	**100**	**135**	**135**	**150**	**150**	**175**	**175**	**200**	**225**	**250**
Per set - - - - -	$25 50	28 75	28 75	31 50	31 50	36 50	36 50	39 50	43 50	47 50
Size of square - - inches	4½	4½	4½	4½	5	5	5	5	5½	
Weight, each - - - lbs.	**225**	**250**	**275**	**300**	**275**	**300**	**350**	**400**	**450**	
Per set - - - - - - - -	$43 50	47 50	52 50	57 00	52 50	57 00	66 50	75 00	83 50	

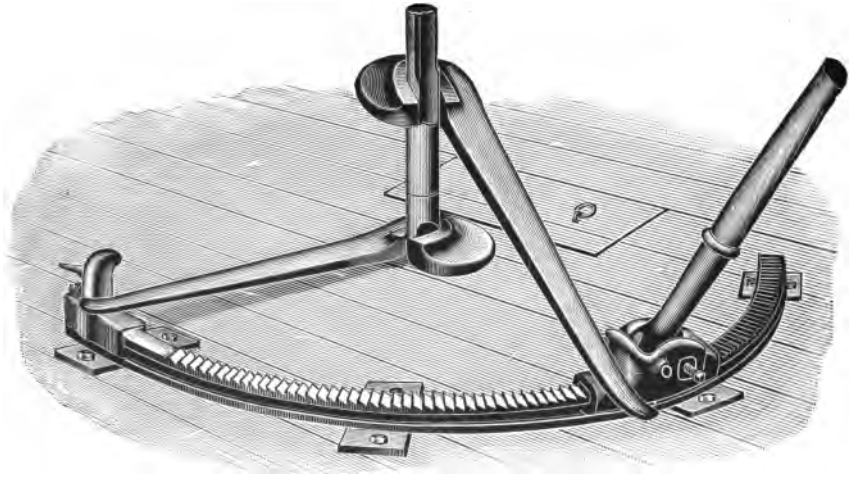
Wrenches under 200 pounds have lifting handles only; 200 pounds and heavier have lifting handles and eyes.

LINERS OR BUSHINGS FOR TOOL WRENCHES

4 x 3½ inches - - - - - per set, $5 00
4¼ x 4 inches - - - - - per set, 6 50
5 x 4 inches - - - - - - per set, $8 00
5½ x 4 or 5 inches - - - - - per set, 8 50

BARRETT PATENT OIL WELL JACK

Fig. 1641



For tools with squares under 4 inches, use a No. 1 jack; for 4 inches and over, use a No. 2.

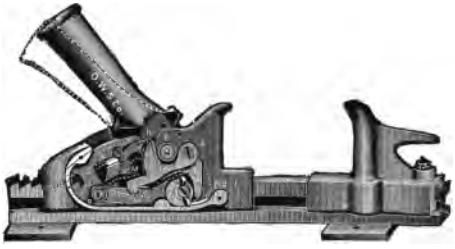
The Barrett oil well jack is a powerful and durable apparatus, which is almost indispensable. It is very easily put in position, and can be removed quickly when not in use. It has almost displaced the wrench circle and bar. With this jack joints can be set up with certainty and unscrewed with ease. Persons not familiar with the jack should be cautious not to apply too much power in setting up joints.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

BARRETT PATENT OIL WELL JACK—No. 1

Fig. 1643

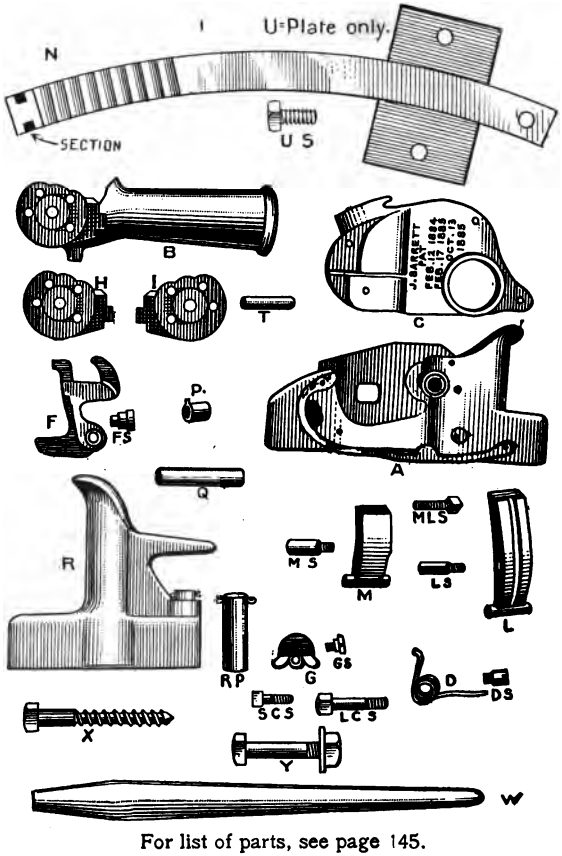


Weight, complete, 209 pounds

No. 1 jack, complete	$32 50
Single acting jack, complete	22 00

Fig. 1645

NO. 1 OIL WELL JACK REPAIR PARTS.



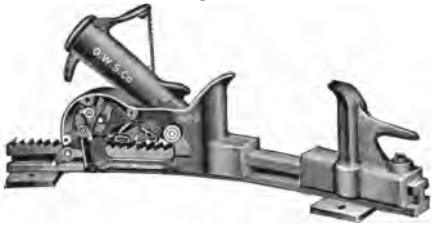
For list of parts, see page 145.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

BARRETT PATENT OIL WELL JACK—No. 2

Fig. 1647

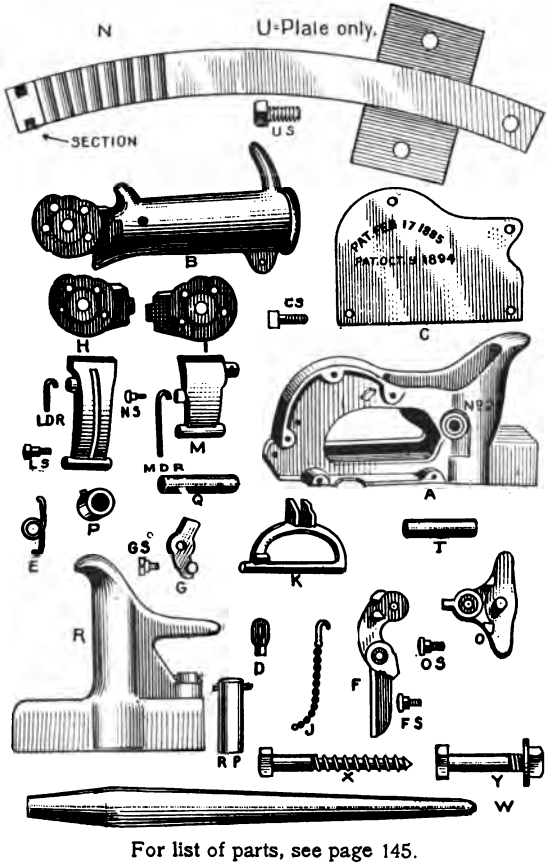


Weight, complete, 280 lbs.

No. 2 jack, complete - $45 00

Fig. 1649

NO. 2 OIL WELL JACK REPAIR PARTS.



For list of parts, see page 145.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

PARTS OF No. 1 AND SINGLE ACTING OIL WELL JACKS

No. 1 jack illustrated on page 143.

Symbol	Name of part	Price, No. 1	Price, Single acting
	Base or cage, complete	$16 00	$11 00
A	Base or cage with bushings	6 00	5 00
B	Socket lever with side plates	2 75	2 75
C	Shield	1 00	---
D	Spring	10	---
DS	Spring screw	10	---
F	Brass lowering block	1 50	---
FS	Lowering block screw	10	---
G	Eccentric	30	---
GS	Eccentric screw	10	---
H	Right hand side plate	25	25
I	Left hand side plate	25	25
L	Long pawl only	1 75	1 75
LS	Long pawl screw	10	---
LCS	Long shield screw	05	---
M	Short pawl only	1 50	1 50
MRS	Short pawl reversing screw	10	---
MLS	Short pawl lifting screw	10	10
N	Steel rack and plates	16 00	16 00
P	Bushings (2) each	15	15
Q	Fulcrum pin	25	25
R	Wrench post and pin	3 75	3 75
RP	Wrench post pin	25	25
SCS	Short shield screw (3) each	05	---
T	Socket lever rivet (2) each	05	05
U	Rack plate (4) each	30	30
US	Rack plate screw (8) each	10	10
W	Wood handle	30	30
X	Lag screw (3) each	10	10
Y	Bolt and washer (5) each	15	15

PARTS OF No. 2 OIL WELL JACKS

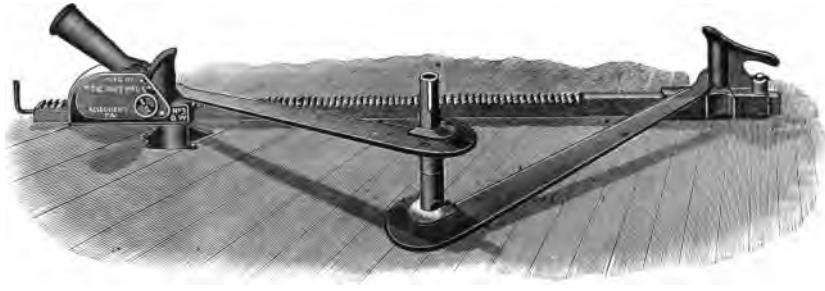
For illustrations, see page 144.

Symbol	Name of part	Price
	Base or cage, complete	$21 00
A	Base or cage with bushings	9 00
B	Socket lever with side plates	4 00
C	Shield	1 00
CS	Shield screws (5) each	05
D	Adjusting link (2) each	20
E	Spring	30
F	Intermediate lever	25
FS	Intermediate lever screw	10
G	Reversing lever	20
GS	Reversing lever screw	10
H	Right hand side plate	30
I	Left hand side plate	30
J	Carrying handle chain	50
K	Carrying handle	30
L	Long pawl	2 00
LS	Long pawl screw	10
LDR	Long pawl rod	15
M	Short pawl	1 75
MS	Short pawl screw	10
MDR	Short pawl rod	15
N	Steel rack with plates	24 00
O	Spring holder	25
OS	Spring holder screw	10
P	Bushing (2) each	20
Q	Fulcrum	30
R	Wrench post and pin	4 75
RP	Wrench post pin	25
T	Socket lever rivet (2) each	05
U	Rack plate (4) each	40
US	Rack plate screw (8) each	10
W	Wood handle	35
X	Lag screw (3) each	10
Y	Bolt and washer (5) each	15

BARRETT STRAIGHT LINE OIL WELL JACK

No. 3

Fig. 1650



Patented

No. 3Jack, complete - $30 00

Weight, 185 pounds

PARTS

Symbol	Name of part	Price
----	Base or cage, with bushings	$8 00
P	Bushings (2)	each 15
Q	Fulcrum pin	25
----	Base or cage, complete	18 00
B	Socket lever, with side plates	2 75
H	Right hand side plate	25
I	Left hand side plate	25
T	Socket lever rivet (2)	each 05
W	Wood handle	30
L	Long pawl only	1 75
LS	Long pawl screw	10
M	Short pawl only	1 50
MRS	Short pawl reversing screw	10
MLS	Short pawl lifting screw	10
D	Spring	10
DS	Spring screw	10
C	Shield	1 00
SCS	Short shield screw (3)	each 05
LCS	Long shield screw	05
F	Brass lowering block	1 50
FS	Lowering block screw	10
G	Eccentric	30
GS	Eccentric screw	10
R	Wrench post and pin	3 75
RP	Wrench post pin	25
----	Steel rack	13 50
----	Rack handle	30

WELL DRILLING TOOLS

Fig. 1635 FOR CABLE SYSTEM

WRENCH CIRCLE

Regular, ½ in. x 9 ft., weight 55 lbs. $7 00
Regular, ⅝ in. x 9 ft., weight 75 lbs. 9 25

Fig. 1637 **WRENCH CIRCLE HOOK**

Steel, weight 10 lbs. - $3 00

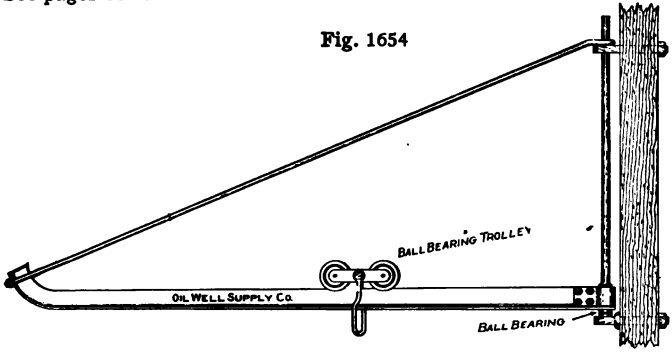
Fig. 1639

STEEL WRENCH BAR

Size - - - - - - - - - - - - - - - - - - inches	1½	1¾	2	2¼
Weight - - - - - - - - - - - - - - - - - - **lbs.**	**50**	**58**	**67**	**75**
Price -	$3 50	4 00	4 50	5 50

The above outfit is little used, having been supplanted by Barrett's patent oil well jacks. See pages 142 to 146.

Fig. 1654



BALL BEARING DERRICK CRANE

Extra Heavy.

Weight, 345 lbs.

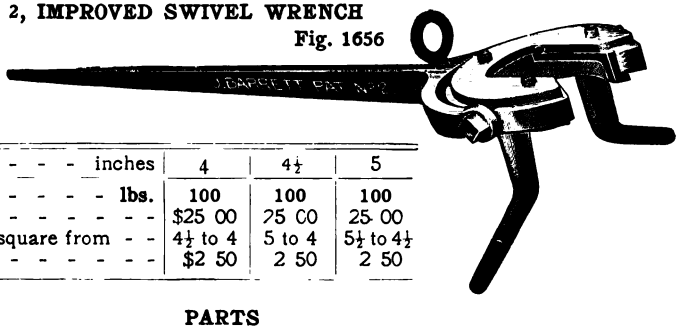
Crane and Trolley complete, each $50 00

PARTS

Beam and Strap	$17 00
B. B. Trolley -	20 00
Eye Bolts, each	3 50
Strain Rod - -	4 00
B. B. Washer -	2 50
Upright Rod -	3 00

BARRETT No. 2, IMPROVED SWIVEL WRENCH

Fig. 1656



Size of square - - - - - - inches	4	4½	5
Weight - - - - - - - - - **lbs.**	**100**	**100**	**100**
Each - - - - - - - - - - - -	$25 00	25 00	25 00
Extra plates to reduce square from - -	4½ to 4	5 to 4	5½ to 4½
Each - - - - - - - - - - - -	$2 50	2 50	2 50

PARTS

C. I. Ring - - - - - - - - -	$4 00	Pivot Bolts - - - - - - each	$0 50
Mall " with handle - - - - -	8 00	Eye " - - - - - - - "	1 00
W. I. " - - - - - - - - - -	5 50		

WELL DRILLING TOOLS

FOR CABLE SYSTEM

DIFFERENTIAL PULLEY BLOCKS

WESTON PATTERN DIRECT—Fig. 5330

Fig. 5330

Size - - - - - - tons	¼	½	1	1½	2	3
Price - - - complete	$18 00	21 00	28 00	36 00	45 00	60 00
Extra chain - - per foot	75	80	85	90	95	1 00
Weight - - - - lbs.	**22**	**30**	**51**	**81**	**122**	**180**

Fig. 5331

MOORE ANTI-FRICTION—Fig. 5331

Capacity	Price complete, with chain	Extra main chain, per foot	Extra hand chain, per foot	Height of hoist, feet	Weight of block complete, with chains, lbs.	Shortest distance between hooks, inches
No. 0. ½ ton -	$25 00	40	25	7	**39**	16
No. 1. 1 ton -	30 00	44	25	8	**73**	20
No. 1½. 1½ tons -	40 00	48	25	8½	**90**	21
No. 2. 2 tons -	50 00	52	25	9	**128**	23
No. 3. 3 tons -	70 00	60	25	10	**195**	29
No. 4. 4 tons -	95 00	70	25	11	**250**	32
No. 5. 5 tons -	125 00	80	25	12	**353**	36
No. 6. 6 tons -	150 00	80	25	12	**400**	37
No. 8. 8 tons -	200 00	1 25	25	12	**580**	41
No. 10. 10 tons -	250 00	1 25	25	12	**625**	41
No. 15. 15 tons -	350 00	1 50	25	12	**780**	45

HARRINGTON PATTERN HOIST

Fig. 5332

Lift, feet	To raise, lbs.	Price	Extra lift, per foot	Weight lbs.
8	500	$22 50	1 00	**35**
8	1,000	25 00	1 20	**52**
8	2,000	30 00	1 50	**65**
8	3,000	40 00	1 75	**76**
9	4,000	50 00	2 00	**140**
10	6,000	75 00	2 20	**226**
10	8,000	95 00	2 40	**258**
12	10,000	140 00	3 00	**625**
12	12,000	180 00	3 75	**750**
12	16,000	210 00	4 00	**875**
12	20,000	275 00	4 25	**925**

SPECTACLES FOR CARRYING BITS

Fig. 1695

Price - - - - - - - - - - - - - - - - $2 50

Weight, 8 pounds

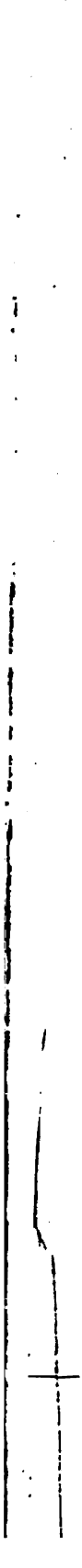


Fig. 1659

WELL DRILLING TOOLS

FOR CABLE SYSTEM

JOINTS

It has been shown in the foregoing pages that a similarity exists between all "strings" of tools used in the cable drilling process, but it is not an exaggeration to say that everything depends on the proper combination of the parts and the perfect fitting of joints. Any tool designed for use in the well must be equipped, at either one end or both, with a joint or means of attachment to the other parts of the "string." The taper joint has been found superior to the old style straight joint, and is now almost universally adopted, see Fig. 1659. The measurement is taken diametrically across the narrowest and widest part, thus, a 2x3 joint is one measuring 2 inches across the narrowest part, and 3 inches across the base, or widest part of the screw. The table on page 150 shows the sizes in common use. The threads may be either 7 or 8 to the inch, and the form may be either sharp "V" or flat. The joints must be provided with square or flat surfaces, on which the wrenches are placed for screwing up or taking apart. Hence we have three distinct specifications which must enter into a description of any drilling tool joint; **The measurement of the truncated cone or joint proper, the number and form of the thread, and the size of the square for the wrenches.** Unfortunately there is a variation in the standards of different manufacturers, and when tools are required for use in connection with other tools than those included in the order or shipment, the **maker's mark** must also be added to the description. The mark is usually stamped with steel dies in the largest part or collar of the joint.

8-thread sharp **7-thread sharp** **7-thread flat**

We have the templates of all reputable makers, and can supply new tools or repairs to suit as readily as our own special standards.

EXAMPLE

For description, see Fig. 1659 for either box or pin end of joint, "2½ x 3½—8 sharp, 4-inch square O. W. S."

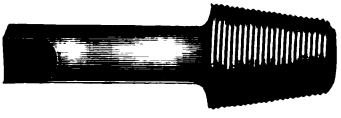
N. B.—We recommend the use of 7 threads flat.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

BOX AND PIN TEMPLATES

Fig. 1658



Box

Fig. 1660

Pin

FINGER GAUGE

Fig. 1662

For joint	1⅜ x 2	1⅝ x 2½	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾	3 x 4	3¼ x 4¼	3½ x 4½	4 x 5
Per set, figs. 1658, 1660, 1662	$11 50	13 50	16 00	17 50	19 00	20 50	22 50	24 00	26 50	29 00
Weight lbs.	**10**	**15**	**20**	**30**	**35**	**40**	**45**	**50**	**55**	**60**

PATENT TAPER JOINTS

BOX

Fig. 1665

PIN

Fig. 1663

Used on all tools unless otherwise ordered. 7 flat or 8 sharp threads to the inch

Size inches	1⅝ x 2½	1¾ x 2¾	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾	3 x 4	3¼ x 4¼	3½ x 4½	4 x 5
Size squares, inches	2½	2¾	3¼	3½	4	4	4½	5	5	5½
Boxes, fig. 1665	$7 00	7 50	8 75	9 50	11 00	12 00	16 50	21 00	23 50	30 00
Weight lbs.	**40**	**45**	**60**	**80**	**100**	**110**	**140**	**150**	**160**	**170**
Pins, fig. 1663	$5 25	5 75	7 50	8 25	10 00	10 50	15 50	20 00	21 50	29 00
Weight lbs.	**35**	**40**	**55**	**70**	**90**	**100**	**130**	**140**	**150**	**160**

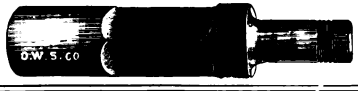
PATENT TAPER JOINT

7 flat threads or 8 sharp threads to the inch

We do not advise using joints with larger collars than shown in accompanying table

Size of hole	Size of joint	Size of wrench square	Diameter of pin collar	Diameter of box collar
3½ or 4 inch	1⅜ x 2 inch	2¼ inch	2⅞ inch	3 inch
4¼ or 4½ inch	1⅝ x 2½ inch	2½ inch	3½ inch	3⅝ inch
5 inch	2 x 3 inch	3¼ inch	4¼ inch	4⅜ inch
5⅝ inch	2¼ x 3¼ inch	3½ inch	4½ inch	4¾ inch
6¼ inch	2½ x 3½ inch	4 inch	5 inch	5⅜ inch
6¼ or 6⅝ inch	2¾ x 3¾ inch	4 inch	5¼ inch	5⅜ inch
7⅝ or 8¼ inch	3 x 4 inch	4½ inch	6 inch	6¼ inch
8 or larger	3¼ x 4¼ inch	5 inch	6¼ inch	6⅜ inch
8 or larger	3½ x 4½ inch	5 inch	6½ inch	6⅝ inch
8 or larger	4 x 5 inch	5½ inch	7 inch	7⅜ inch

Fig 1666



SUBSTITUTE

FROM PIPE OR CASING TO TOOL JOINT

WITH ROPE SOCKET NECK

Size casing inches	5	5⅝	6¼	6⅝
Size tool joint	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾
Weight lbs.	**90**	**110**	**125**	**135**
Price each	$15 50	19 00	22 50	24 00

WELL DRILLING TOOLS

FOR CABLE SYSTEM

Fig. 1669

SUBSTITUTE

With joints	Weight, lbs.	Price	With joints	Weight, lbs.	Price
1⅝ x 2½ to 2 x 3	65	$11 50	2½ x 3½ to 2½ x 3½	110	$14 25
2 x 3 to 2 x 3	85	11 75	2½ x 3½ to 2¾ x 3¾	120	15 00
2 x 3 to 2¼ x 3¼	90	12 25	2¾ x 3¾ to 2¾ x 3¾	125	16 00
2 x 3 to 2¾ x 3¾	110	15 00	2¾ x 3¾ to 3 x 4	175	19 00
2¼ x 3¼ to 2¼ x 3¼	100	12 75	2¾ x 3¾ to 3¼ x 4¼	200	22 00
2¼ x 3¼ to 2½ x 3½	100	13 50	2¾ x 3¾ to 3½ x 4½	210	23 00

BOXES WITH SOLID OR SWIVEL EYE

Fig. 1679

Box with solid eye

Fig. 1677

Box with swivel eye

PINS WITH SOLID OR SWIVEL HOOK

Fig. 1673

Pin with solid hook

Fig. 1675

Pin with swivel hook

Size - - - - - - - - inches	1⅝ x 2½	1¾ x 2¾	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾	3 x 4	3¼ x 4¼
Size squares - - - - - inches	2½	2¾	3¼	3½	4	4	4½	5
Box with solid eye, Fig. 1679 - -	$10 50	11 50	13 25	14 00	16 00	18 25	23 00	28 00
Box with swivel eye, Fig. 1677 -	15 50	16 40	18 00	19 00	20 50	23 00	28 50	35 00
Pin with solid hook, Fig. 1673 - -	10 25	11 00	12 75	13 50	15 25	15 50	21 50	26 00
Weight, each, Figs.1679-77-73, lbs.	**40**	**45**	**60**	**80**	**100**	**110**	**140**	**150**
Pin with swivel hook, Fig. 1675 -	12 00	13 50	16 50	18 00	21 00	23 00	27 00	30 50
Weight, each, Fig. 1675 - - lbs.	**45**	**50**	**65**	**85**	**105**	**120**	**150**	**160**

THREAD PROTECTORS

FOR SEVEN FLAT OR EIGHT SHARP THREADS

Fig. 1657

For box

Fig. 1661

For pin

For size box or pin - - -	1⅜ x 2	1⅝ x 2½	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾	3 x 4	3¼ x 4¼	3½ x 4½
Box protectors - - - -	$0 40	45	55	55	60	80	1 00	1 00	1 15
Pin protectors - - - -	45	50	60	60	65	90	1 10	1 10	1 25

When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

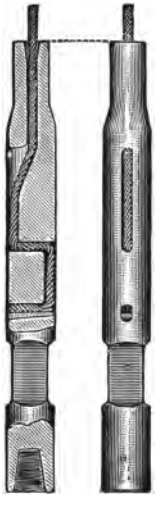
WELL DRILLING TOOLS

FOR CABLE SYSTEM

SOCKETS FOR DRILLING WITH WIRE ROPE

O. W. S. CO. PATENT
Fig. 1577A

RIGBY PATENT
Fig. 1577B



BABCOCK
Fig. 1577D

Size hole for - - - - - - - inches	4¼	5	5⅝	6	6¼ and larger
Size box - - - - - - - - - inches	1⅝ x 2½	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾
Fig. 1577A - - - - - - - - - -	$35 00	36 00	36 00	45 00	45 00
Weight - - - - - - - - - lbs	**100**	**110**	**140**	**175**	**175**
Fig. 1577B - - - - - - - - - -	$27 00	30 00	32 00	34 50	36 00
Weight - - - - - - - - - lbs	------	------	------	------	------
Fig. 1577D - - - - - - - - - -	------	11 00	12 50	15 00	15 50
Weight - - - - - - - - - lbs	------	**55**	**65**	**80**	**80**

The O. W. S. Co. patent socket is one of the simplest and best sockets in use. It can be adjusted or removed without loss of time. In attaching the socket, the sub-joint is unscrewed and the cone slips and spring withdrawn. The rope is then passed down through the socket. The end of the rope is hammered into a short loop to prevent its pulling through the socket. The slips are then adjusted and forced into position. The lower spring is then inserted and the upper and lower parts of the body screwed together. As the slips are conical, the greater the strain on the cable the tighter the grip. The spring acting between the pin end of the sub-joint and the lower end of the slips, prevents the loosening or jarring down of the slips.

When ordering, state size of box, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

ROPE SOCKETS AND PARTS

Fig. 1580

Patent

Fig. 1582

Sub

Fig. 1584

New Era

Fig. 1586

Wing

Fig. 1592

Bradford

Fig. 1588

Screw wedge for Bradford socket

Fig. 1597

Smith's patent

Fig. 1594

Slip for Smith's patent socket

Fig. 1590

Wedge wrench for Bradford socket

Size of box, inches	PATENT Fig. 1580		SUB Fig. 1582		NEW ERA Fig. 1584		WING Fig. 1586		BRADFORD Fig. 1592		SMITH Fig. 1597	
	Wt., lbs.	Price	Wt., lbs.	Price	Wt., lbs.	Price	Wt., lbs	Price	Wt., lbs.	Price	Wt., lbs.	Price
1⅝ x 2½	---	---	**100**	22 50	---	---	**65**	14 00	---	---	---	---
2 x 3	**50**	$11 00	**110**	24 00	**110**	19 50	**85**	16 00	**50**	21 00	**110**	21 50
2¼ x 3¼	**60**	12 50	**140**	27 00	**125**	21 00	**90**	17 00	**60**	21 50	**125**	23 50
2½ x 3½	**75**	15 00	**175**	29 00	**150**	23 50	**100**	18 50	**75**	22 50	**150**	26 50
2¾ x 3¾	**75**	15 50	**175**	32 00	**150**	24 50	**110**	19 50	**75**	25 00	**150**	27 50
3 x 4	**100**	19 50	---	------	**200**	32 00	**125**	23 00	**100**	27 00	**200**	36 00
3¼ x 4¼	**110**	22 50	---	------	**220**	35 50	---	---	---	---	**220**	40 50

Screw wedge for Bradford rope socket, fig. 1588	$3 00
Wedge wrench for Bradford rope socket, fig. 1590	2 50
Extra slips for Smith's patent rope socket, fig. 1594	per pair, 1 50
Extra set screws	25

DRILLING JARS

For fishing jars, see page 162.

Fig. 1599

4½-inch stroke. Patented April 24, 1900

Diameter - - - inches	3½	3⅝	4⅜	5¼	5¼	5½	6¼	6½	6¼	7
Size of hole to drill in - - - - - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝ and larger	7⅝ and larger	7⅝ and larger	7⅝ and larger
Size box and pin - - - - - - inches	1⅝x2½	1⅝x2½	2 x 3	2 x 3 or 2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼
Weight - - - lbs.	**100**	**125**	**200**	**300**	**300**	**325**	**450**	**500**	**550**	**600**
Per set - - - - -	$60 00	62 00	70 00	83 00	83 00	87 00	111 00	117 00	123 00	130 00

When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square: also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

AUGER STEMS AND SINKER BARS

SINKER BAR—Fig. 1601

6 to 14 feet long.

16 to 48 feet long.

AUGER STEM—Fig. 1603

Size - - - - - inches	WITH 1⅝ x 2½ BOX AND PIN			WITH 2 x 3 BOX AND PIN			WITH 2¾ x 3¾ BOX AND PIN			WITH 2¾ x 3¾ PIN AND 3 x 4 BOX		
	2¾	3	3¼	3½	3¾	4	4¼	4½	5	5¼	5½	5¾
Weight, per foot - lbs.	**20**	**24**	**28**	**33**	**38**	**43**	**49**	**55**	**68**	**75**	**82**	**90**
6 feet long - - - - -	$19 75	20 25	22 00	26 25	28 00	28 75	36 25	37 00	41 25	------	------	------
8 feet long - - - - -	21 00	21 75	24 00	28 25	30 75	31 75	40 00	41 00	46 50	------	------	------
10 feet long - - - - -	22 25	23 50	25 75	30 50	33 25	34 75	43 50	45 00	51 75	------	------	------
12 feet long - - - - -	23 75	25 00	27 75	32 75	36 00	37 75	47 00	49 00	56 75	------	------	------
14 feet long - - - - -	24 75	26 75	29 50	35 00	38 75	40 75	50 50	53 00	62 00	------	------	------
16 feet long - - - - -	26 00	28 25	31 50	37 25	41 25	43 75	54 00	57 00	67 00	------	------	------
18 feet long - - - - -	27 25	29 75	33 25	39 25	44 00	46 75	57 75	61 00	72 25	------	------	------
20 feet long - - - - -	28 75	31 50	35 25	41 50	46 50	49 50	61 25	65 00	77 25	------	------	------
22 feet long - - - - -	30 00	33 00	37 00	43 75	49 25	52 75	64 75	69 00	82 50	------	------	------
24 feet long - - - - -	31 25	34 75	39 00	45 75	51 75	55 75	68 25	73 25	87 75	------	------	------
26 feet long - - - - -	32 25	36 25	41 00	48 00	54 50	58 75	72 00	77 25	92 75	------	----	------
28 feet long - - - - -	33 75	38 00	42 75	50 25	57 00	61 75	75 50	81 25	98 00	------	------	------
30 feet long - - - - -	35 00	39 50	44 75	52 50	59 75	64 75	79 00	85 25	103 00	118 75	126 50	148 00
32 feet long - - - - -	36 25	41 00	46 50	54 50	62 25	67 75	82 50	89 25	108 25	124 50	133 00	156 00
34 feet long - - - - -	37 50	42 75	48 50	56 75	65 00	70 75	86 25	93 25	113 50	130 25	139 50	164 00
36 feet long - - - - -	38 75	44 25	50 25	59 00	67 75	73 75	89 75	97 25	118 50	136 50	146 00	172 00
38 feet long - - - - -	40 00	46 00	52 25	61 00	70 25	76 75	93 25	101 25	123 75	142 50	152 50	180 00
40 feet long - - - - -	41 50	47 50	54 00	63 25	73 00	79 75	96 75	105 25	129 00	148 50	159 00	188 00
42 feet long - - - - -	42 75	49 00	56 00	65 50	75 50	82 75	100 50	109 25	134 00	------	------	------
44 feet long - - - - -	-----	50 75	57 75	67 50	78 25	85 75	104 00	113 50	139 00	------	------	------
45 feet long - - - - -	-----	51 50	58 75	68 75	79 50	87 25	105 75	114 25	142 00	------	------	------
46 feet long - - - - -	-----	-----	59 75	70 00	80 75	88 75	107 50	117 50	144 50	------	------	----
48 feet long - - - - -	-----	-----	61 50	72 00	83 50	91 50	111 00	121 25	149 50	------	------	------

ADD FOR ABOVE WITH	Box	Pin	ADD FOR ABOVE WITH	Box	Pin	ADD FOR ABOVE WITH	Box	Pin	ADD FOR ABOVE WITH	Box	Pin
1¾ x 2¼	$0 60	75	2¼ x 3½	$0 60	75	3 x 4	$4 00	4 25	3 x 4	-----	4 25
2 x 3	1 75	2 00	2½ x 3½	1 80	2 00	3¼ x 4¼	7 75	8 25	3¼ x 4¼	$4 00	8 50
-----	-----	----	2¾ x 3¾	2 75	2 60	3½ x 4½	10 00	9 25	3½ x 4½	6 00	9 25
-----	-----	----	3 x 4	6 75	6 75	4 x 5	15 50	16 00	4 x 5	11 25	16 00

Stems are f. o. b. cars, Pittsburgh, Pa. At branch machine shops, add freight.

For specifications of joints generally used, see page 150. When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

SPUDDING BITS

Fig. 1605

Size of hole, inches	Size of pin, inches	Amount of steel each, lbs.	Total weight each, lbs.	Price, each
10	2¾ x 3¾	80	250	$37 00
12	2¾ x 3¾	80	300	40 00
12	2¾ x 3¾	100	350	43 00
13	2¾ x 3¾	80	350	43 00
13	2¾ x 3¾	100	400	45 50
13	2¾ x 3¾	120	450	48 50
13	2¾ x 3¾	150	500	52 50
14	2¾ x 3¾	80	400	46 50
14	2¾ x 3¾	100	450	49 50
14	2¾ x 3¾	120	500	52 00
16	2¾ x 3¾	100	500	57 00
16	2¾ x 3¾	150	550	64 00
16	2¾ x 3¾	200	600	71 00
18	2¾ x 3¾	150	650	73 00
18	2¾ x 3¾	200	700	80 00
18	2¾ x 3¾	250	750	87 00

DRILLING BITS

Bits are sold in pairs or sets of two

Fig. 1609

Regular form of 4¼ to 6⅝ inch bits. From 4 to 6 feet in length.

Fig. 1604

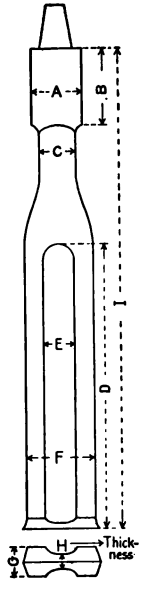


Fig. 1607

Regular form of 7⅝ and larger. From 4½ to 5½ feet in length.

When other than standard or stock bits are required, measurements conforming to the diagram, fig. 1604, should be given.

A—Diameter of collar. D—Length of water channel. G—Thickness of blade.
B—Length of collar. E—Width of water channel. H—Thickness of bit in channel.
C—Size of wrench square. F—Width of blade. I —Length of bit.

Also state size of pin, style of taper, number of threads to the inch, sharp or flat.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

DRILLING BITS—Figs. 1607-9. Prices in this list are per set (2)

Size hole, inches	Size pin, inches	Amount of steel, each, lbs.	Total weight per set, lbs.	Price, per set (2)	Size hole, inches	Size pin, inches	Amount of steel, each, lbs.	Total weight per set, lbs.	Price, per set (2)
4 or 4¼	1⅝ x 2¼	40	200	$39 00	8¼	2¾ x 4½	80	600	$68 00
4 or 4¼		50	210	40 50	8¼		90	650	71 00
4 or 4¼		60	225	42 50	8¼		100	700	73 50
4 or 4¼		80	250	47 50	8¼		110	725	76 00
4½		40	290	40 00	8¼		120	750	79 00
4½		50	300	42 00	8¼		130	765	84 50
4½		60	315	44 00	8¼		140	780	88 00
4½		80	350	48 50	8¼		150	800	91 00
5	2 x 3	60	340	46 50	8¼		175	900	98 00
5		70	350	48 50	8¼		200	1,000	105 00
5		80	360	51 00	8¼		250	1,100	119 00
5		90	370	53 00	8¼		300	1,200	133 00
5		100	380	55 00	9⅝		200	1,050	108 50
5		120	390	60 00	10		100	800	85 50
5⅛	2 x 3 or 2¼ x 3¼	60	350	49 00	10		120	850	91 00
5⅛		70	360	51 50	10		130	865	94 00
5⅛		80	370	54 00	10		140	880	96 50
5⅛		90	380	56 00	10		150	900	99 50
5⅛		100	400	58 50	10		175	1,000	106 50
5⅛		120	430	63 50	10		200	1,100	113 50
5⅛		150	450	70 50	10		250	1,200	127 00
6¼	2 x 3 to 2¾ x 3¾	70	450	55 50	10	2¾ x 3¾ to 3½ x 4½	300	1,300	141 00
6¼		80	470	58 00	10⅝		200	1,120	118 00
6¼		90	485	61 00	11		100	875	98 00
6¼		100	500	65 50	11		150	925	104 00
6¼		120	550	71 00	12		120	900	100 00
6¼		130	560	76 00	12		150	1,000	109 00
6¼		140	580	78 50	12		175	1,100	115 50
6¼		150	600	81 50	12		200	1,250	122 50
6¼		175	625	88 00	12		250	1,350	136 50
6¼		200	650	95 00	12		300	1,450	151 00
6⅝	2¾ x 3¾	100	550	70 00	12		350	1,550	165 00
6⅝		110	575	73 00	13		100	900	100 00
6⅝		120	600	76 00	13		120	1,000	106 00
6⅝		130	615	78 50	13		150	1,100	114 00
6⅝		140	630	81 50	13		175	1,200	121 00
6⅝		150	650	84 00	13		200	1,350	128 00
6⅝		175	665	91 00	13		250	1,500	142 00
6⅝		200	675	98 00	13		300	1,600	156 00
7⅝		100	650	73 50	13		400	1,700	184 00
7⅝		110	675	77 00	14		150	1,150	124 00
7⅝		120	700	80 00	14		200	1,400	135 00
7⅝		130	715	83 00	14		250	1,550	146 00
7⅝		140	730	85 50	14		300	1,650	156 00
7⅝		150	750	88 00	14		400	1,750	197 00
7⅝		175	800	95 00	16		250	1,600	168 00
7⅝		200	900	102 00	16		300	1,750	182 00
7⅝		300	1,100	130 00	18		250	1,700	174 00
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Total weights are approximate.

BIT GAUGE—Fig. 1615

Size - - - inches	4. 4¼ or 4½	4¾ & 5	5⅝	6 or 6¼	6⅝	7⅝	8 or 8¼	8⅝	9⅝ or 10	11⅝ or 12	13	14	16	18	20
Weight - - - lbs.	**1.5**	**2.**	**3.**	**3.3**	**3.5**	**3.8**	**4.**	**4.2**	**4.5**	**5**	**5**	**5.5**	**6**	**7**	**8**
Each - - - - - -	$0 95	1 05	1 15	1 20	1 30	1 40	1 50	1 60	1 80	2 15	2 35	2 50	2 90	3 30	3 75

WELL DRILLING TOOLS

FOR CABLE SYSTEM

DRILLING BITS

CALIFORNIA PATTERN, Fig. 1612

RUSSIAN PATTERN, Fig. 1614

MOTHER HUBBARD PATTERN, Fig. 1616

CALIFORNIA PATTERN—Fig 1612

Prices in this list are per set of two.

Size of hole - - - - - - - inches	4¼	5⅝	5⅝	7⅝	7⅝	7⅝	7⅝	7⅝	8	9⅝	9⅝
Length - - - - - - - - feet	5½	5½	5½	5½	5½	5½	5½	6	6	5½	5½
Amount of steel, each - - - pounds	60	100	120	120	130	150	200	200	200	150	175
Total weight per set - - - pounds	**380**	**400**	**430**	**750**	**750**	**800**	**900**	**1100**	**1150**	**1100**	**1100**
Per set (2) - - - - - - - -	$45 50	60 50	65 00	83 00	84 50	91 00	105 00	112 00	103 00	99 00	110 00

Size of hole - - - - - inches	9⅝	9⅝	9⅝	9⅝	10	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝
Length - - - - - - - - feet	5½	5½	5½	6	6	4½	4½	4½	5	5½	5½
Amount of steel, each - - pounds	200	250	300	300	250	150	175	200	200	250	300
Total weight per set - - pounds	**1200**	**1200**	**1200**	**1380**	**1400**	**1000**	**1000**	**1000**	**1120**	**1400**	**1400**
Per set (2) - - - - - - -	$117 00	130 00	144 00	153 00	137 00	109 00	116 00	123 00	130 00	151 00	165 00

Size of hole - - - - - inches	11⅝	11⅝	11⅝	12½	14	14	14	14	14	.....	.....
Length - - - - - - - - feet	5½	5½	6	5½	5	5½	5½	5½	6	.....	.....
Amount of steel, each - - pounds	350	400	400	250	250	300	350	400	400	.....	.....
Total weight per set - - pounds	**1600**	**1600**	**1720**	**1500**	**1600**	**1800**	**1800**	**1800**	**1860**	.....	....
Per set (2) - - - - - - -	$178 00	192 00	208 00	152 00	171 00	184 00	200 00	212 00	231 00	....	.....

RUSSIAN PATTERN—Fig. 1614

Size of hole - - inches	6	8	10	12	14	16	18	20	22	24
Size of pin - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Am'nt of steel, each, lbs.	100	125	150	150	200	200	250	250	300	300
Total wt. per set, lbs.	**480**	**525**	**600**	**680**	**730**	**800**	**920**	**1050**	**1280**	**1350**
Per set (2) - - - -	$72 00	87 50	104 00	112 00	126 00	134 00	155 00	168 00	192 00	205 00

MOTHER HUBBARD PATTERN—Fig. 1616

Size of hole - - - - inches	7⅝	7⅝	7⅝	7⅝	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼
Amount of steel each - pounds	100	120	150	200	80	90	100	120	150	175	200	250
Total weight per set - pounds	**700**	**750**	**800**	**950**	**650**	**700**	**750**	**800**	**850**	**950**	**1050**	**1150**
Per set (2) - - - - - -	$78 00	84 00	92 00	107 50	75 00	78 00	81 00	87 00	95 50	103 00	110 00	125 00

Size of hole - - - inches	8¼	10	10	10	10	10	10	10	13	13	13	13
Amount of steel, each, pounds	300	100	120	150	175	200	250	300	150	200	250	300
Total weight per set, pounds	**1250**	**850**	**900**	**950**	**1050**	**1150**	**1250**	**1350**	**1150**	**1400**	**1550**	**1650**
Per set (2) - - - - - -	$140 00	94 00	100 00	109 50	117 00	125 00	140 00	155 50	125 50	140 50	156 00	171 50

Total weights are approximate.

DRILLING BITS—ALL STEEL { 5 inch and smaller - - - - - - - - - - - - - - - per pound, $0 14½
5⅝, 6¼, and 6⅝ inch - - - - - - - - - - - - - - per pound, 13
7⅝ inch and larger - - - - - - - - - - - - - - - per pound, 12½

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench **square; also** diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

STAR BIT—Fig. 1687

Size of hole - - - - - - - inches	4¼	4½	5	5⅝	6¼
Size of pin - - - - - - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾
Amount of steel - - - - - - lbs.	80	80	80	100	125
Total weight - - - - - - - lbs.	**150**	**180**	**210**	**250**	**325**
Each - - - - - - - - - - - -	$35 50	37 00	40 00	46 00	59 50

Size of hole - - - - - - - inches	6⅝	7⅝	8¼	10	12
Size of pin - - - - - - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾ to 3¼ x 4¼	2¾ x 3¾ to 3¼ x 4¼	2¾ x 3¾ to 3¼ x 4¼
Amount of steel - - - - - - lbs.	125	125	125	150	200
Total weight - - - - - - - lbs.	**350**	**420**	**450**	**550**	**650**
Each - - - - - - - - - - - -	$63 00	68 50	72 00	86 50	106 00

ROUND REAMER—Fig. 1690

Size of hole - - - - - - - inches	4¼	4½	5	5	5⅝
Size of pin - - - - - - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2 x 3	2¼ x 3¼
Amount of steel - - - - - - lbs.	50	50	60	80	80
Total weight - - - - - - lbs.	**150**	**175**	**200**	**225**	**240**
Each - - - - - - - - - - - -	$30 50	32 00	36 50	38 50	42 50

Size of hole - - - - - - - inches	5⅝	6¼	6¼	6⅝	7⅝
Size of pin - - - - - - - inches	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Amount of steel - - - - - - lbs.	100	80	100	100	100
Total weight - - - - - - lbs.	**260**	**300**	**350**	**380**	**400**
Each - - - - - - - - - - - -	$45 00	46 00	49 00	51 00	57 00

Size of hole - - - - - - - inches	8¼	8¼	8¼	9⅝	10
Size of pin - - - - - - - inches	2¾ x 3¾	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Amount of steel - - - - - - lbs.	100	150	200	150	150
Total weight - - - - - - lbs.	**420**	**480**	**520**	**550**	**600**
Each - - - - - - - - - - - -	$61 00	68 00	76 00	77 00	79 00

Size of hole - - - - - - - inches	10	11⅝	13	13	13
Size of pin - - - - - - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Amount of steel - - - - - - lbs.	200	200	200	250	300
Total weight - - - - - - lbs.	**650**	**750**	**800**	**850**	**900**
Each - - - - - - - - - - - -	$86 00	96 00	104 00	112 00	120 00

STAR OR DOUBLE REAMER—Fig. 1692

Size of hole - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝
Size of pin - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Amount of steel, lbs.	50	50	80	100	100	100	100
Total weight - lbs.	**160**	**180**	**220**	**280**	**330**	**350**	**430**
Each - - - - -	$48 50	51 00	58 00	65 00	70 00	73 00	80 00

Size of hole - - - inches	8¼	9⅝	10	10	12	14
Size of pin - - - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Amount of steel - - - lbs.	100	150	150	300	400	500
Total weight - - - lbs.	**480**	**580**	**640**	**800**	**900**	**1450**
Each - - - - - - - - -	$85 00	103 00	106 00	133 00	177 00	220 00

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

MACK'S IMPROVED AUSTRIAN UNDER REAMER

Patented March 4, 1902

FOR REAMING UNDER WELL CASING

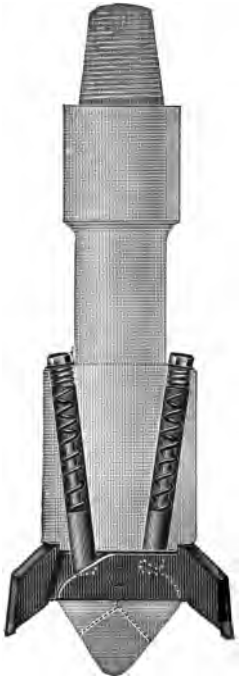
WITH BOX
Fig. 1712

Showing bits or cutters in position for reaming

Fig. 1712-B

Showing bits or cutters in position for passing through pipe or casing

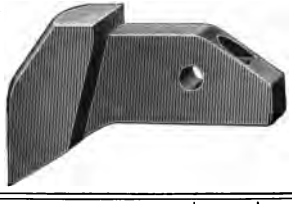
WITHOUT BOX
Fig. 1712-A



Showing construction and action

Bottom hole reamer

BIT OR CUTTER—Fig. 1712-E



Price includes two pair of cutters

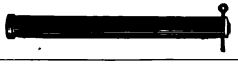
Size - - - - - - - inches	4¼	5	5⅝	6¼	6⅝	7⅝	8	9⅝	10	12
Under reamer complete, incl'ding lever, tongs, and wrench, each	122 00	143 00	148 00	160 00	170 00	210 00	215 00	253 00	262 00	434 00
Weight - - - - - - - lbs.	**150**	**175**	**200**	**250**	**275**	**350**	**400**	**600**	**770**	**1,000**
Without box, Fig. 1712-A, each	110 00	- - - -	141 00	154 00	- - - -	200 00	205 00	- - - -	- - - -	- - - -
Weight - - - - - - - lbs.	**125**	- - - -	**175**	**200**	- - - -	**325**	**350**	- - - -	- - - -	- - - -
Extra cutters - - - per pair	16 00	- - - -	21 50	24 00	26 00	34 50	35 00	40 00	42 00	54 00
Weight - - - - - - - lbs.	**8**	**10**	**12**	**15**	**25**	**35**	**35**	**45**	**50**	**100**

7⅝-inch cutters for 5⅝-inch reamer - - - - - - - - - - - - - -	per pair, $35 50	**Weight, 20 lbs.**
9⅝-inch cutters for 7⅝-inch reamer - - - - - - - - - - - - - -	per pair, 41 00	**Weight, 35 lbs.**
10⅝-inch cutters for 9⅝-inch reamer - - - - - - - - - - - - - -	per pair, 42 00	**Weight, 50 lbs.**
11⅝-inch cutters for 9⅝-inch reamer - - - - - - - - - - - - - -	per pair, 44 50	**Weight, 65 lbs.**
12 -inch cutters for 9⅝-inch reamer - - - - - - - - - - - - - -	per pair, 49 00	**Weight, 75 lbs.**

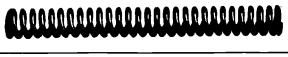
PARTS OF UNDER REAMER

MANDREL—Fig. 1712-H

PIN—Fig. 1712-F



SPRING—Fig. 1712-G



Size - - - - inches	4¼	5	5⅝	6¼	6⅝	7⅝	8	9⅝	10	12
Mandrels - - - each	$1 40	1 40	1 40	1 50	2 00	2 20	2 30	2 50	2 75	5 00
Pins - - - - - each	1 65	2 00	2 25	2 40	2 75	3 40	3 50	4 75	4 90	7 25
Springs - - - each	40	40	40	40	50	50	50	65	65	1 25
Plugs (not illus.), - each	1 65	1 70	1 75	1 90	2 00	2 40	2 40	2 80	2 80	3 75

For list of parts for adjusting cutters, see following page. When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

MACK'S IMPROVED AUSTRIAN UNDER REAMER

Parts for adjusting bits or cutters

Size - - - - - - - - - - - - - - - - inches	4¼	5	5⅝	6¼	6⅝
Levers (not illustrated) - - - - - - - - per pair	$8 75	9 00	9 50	9 75	11 25
Tongs (not illustrated) - - - - - - - - - each	6 25	6 50	6 50	7 75	8 25
Wrenches (not illustrated) - - - - - - - - each	1 50	1 75	1 90	2 00	2 00

Size - - - - - - - - - - - - - - - - inches	7⅝	8	9⅝	10	12
Levers (not illustrated) - - - - - - - - per pair	$14 00	14 00	15 00	16 25	16 50
Tongs (not illustrated) - - - - - - - - - each	9 00	9 40	10 00	10 50	11 00
Wrenches (not illustrated) - - - - - - - - each	2 15	2 25	2 50	2 75	3 00

OLD STYLE AUSTRIAN UNDER REAMER

(Superseded by Mack's patent, March 4, 1902)

For each size of casing two pairs of knives are furnished

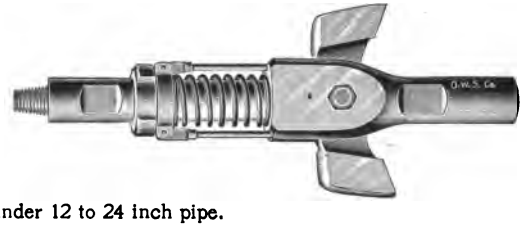
Size of pin and box, inches	1⅝ x 2½		2 x 3		2¼ x 3¼		2¾ x 3¾		
To ream under (casing)	4¼ only	4¼ & 5⅝	5 only	5 & 6¼	5⅝ only	5⅝ & 7⅝	6¼ only	6¼ & 8¼	6⅝ only
Weight - - - - lbs.	**114**	**125**	**184**	**200**	**230**	**250**	**330**	**355**	**360**
Price - - - - - - -	$119 00	164 00	143 00	192 00	163 00	216 00	184 00	240 00	196 00

Size of pin and box, inches	2¾ x 3¾		2¾ x 3¾		2¾ x 3¾		2¾ x 3¾		
To ream under (casing)	6⅝ & 8⅝	7⅝ only	7⅝ & 9⅝	8¼ only	8¼ & 10	9⅝ only	9⅝ & 11⅝	10 only	10 & 13
Weight - - - - lbs.	**385**	**435**	**475**	**485**	**535**	**730**	**790**	**770**	**840**
Price - - - - - - -	$254 00	228 00	292 00	248 00	316 00	293 00	368 00	305 00	382 00

PARTS OF OLD STYLE AUSTRIAN UNDER REAMER

Size body for - - inches	4¼	5	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10
Knives - - - - per pair	$26 50	29 00	31 00	33 00	34 00	37 50	39 50	44 00	45 00
Weight - - - - - lbs.	**12**	**16**	**20**	**25**	**28**	**40**	**50**	**60**	**70**
Knife bolts - - - per pair	6 50	6 50	6 50	6 50	6 50	8 00	8 00	8 00	8 00
Backers - - - - - each	6 00	6 00	6 00	6 00	6 00	8 00	8 00	8 00	8 00
Plungers - - - - - each	4 50	4 50	4 50	4 50	4 50	7 00	7 00	7 00	7 00

RUSSIAN UNDER REAMER—Fig. 1707



Made to ream under 12 to 24 inch pipe.

Prices quoted upon application.

When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

HOLLOW REAMER
Fig. 1697

To straighten a crooked hole or to remove the sediment around tools when they are fast, the object being to make room enough for the fishing tool to take hold.

CONICAL HEAD REAMER
Fig. 1699

To ream out hole that has been drilled past lost tool.

KEARNES HOLE STRAIGHTENING BIT—Fig. 1701

To straighten a crooked hole or to cut off a projection.

McCLEARY PATENT ENLARGING BIT.
Fig. 1709

The patent enlarging bit is a valuable tool in many formations. It drills ahead of the drive pipe or casing the exact size of the outside of the shoe or the couplings, so that the pipe or casing can be forced down with little difficulty. The central bit drills in advance of the enlarging bit.

WINGED SUBSTITUTE
Fig. 1703

To keep stem perpendicular and guard against crooked hole in difficult formations. Used between stem and bit or reamer.

Size of hole - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10
Size of pin - - inches	1⅝x2½	1⅝x2½	2x3	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼	2¼x3¼
Hollow reamer - - -	$54 00	57 00	64 00	72 00	80 00	85 00	98 00	107 00	125 00	130 00
Weight - - - - lbs.	**120**	**150**	**230**	**350**	**420**	**450**	**480**	**510**	**560**	**600**
Conical head reamer -	- - - -	- - - -	60 00	63 00	66 00	- - - -	- - - -	- - - -	- - - -	- - - -
Amount steel - - lbs.	- - - -	- - - -	100	100	100	- - - -	- - - -	- - - -	- - - -	- - - -
Total weight - - lbs.	- - - -	- - - -	**200**	**260**	**350**	- - - -	- - - -	- - - -	- - - -	- - - -
Kearnes bit, fig. 1701 -	$29 00	33 00	39 00	42 00	50 00	56 00	60 00	63 00	75 00	77 00
Amount steel - - lbs.	60	80	100	100	100	120	120	120	150	150
Total weight - - lbs.	**125**	**135**	**150**	**160**	**225**	**250**	**310**	**380**	**400**	**410**
McCleary bit, fig. 1709	$38 00	41 00	48 00	56 00	65 00	70 00	83 00	92 00	110 00	116 00
Weight - - - - lbs.	**125**	**135**	**160**	**185**	**230**	**300**	**350**	**.00**	**480**	**500**
Winged substitute - -	Prices	on spec	ification							
Weight - - - - lbs.	- - - -	- - - -	**200**	**250**	**300**	**350**	**450**	**500**	- - - -	- - - -

MACK PATENT HOLE STRAIGHTENER

Put on auger stem at intervals to keep bit in a straight line. Used when the hole varies from a vertical line.

Size hole for, 8 inches; size stem for, 4½ inches. Price - - - - - - - - - - $50 00
Size hole for, 10 inches; size stem for, 4½ inches. Price - - - - - - - - - - 70 00
Size hole for, 13 inches; size stem for, 4½ inches. Price - - - - - - - - - - 102 00
Size hole for, 13 inches; size stem for, 5 inches. Price - - - - - - - - - - 102 00

For illustrations, see following page.

When ordering, state size of box or pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

MACK PATENT HOLE STRAIGHTENER

COMPLETE

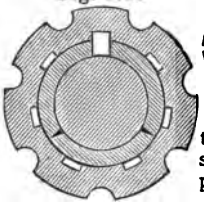
Fig. 1719

SECTIONAL VIEW OF SLIPS

Fig. 1721

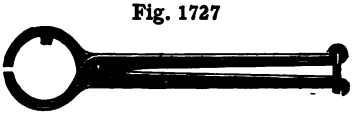
SECTIONAL TOP VIEW

Fig. 1725



TONGS

Fig. 1727



Tongs, fig. 1727, are for holding the slips while the collar is being screwed on. For list, see preceding page.

FISHING JARS

From 12 to 36 inch stroke

Fig. 1790

Patented April 24, 1900.

Diameter, inches	Size hole, inches	Length stroke, inches	Box and pin, inches	Weight, lbs.	Each
3½	4¼	8	1⅜ x 2⅛	110	$62 00
3½		10		115	64 00
3½		12		120	65 00
3½		14		125	67 00
3½		16		130	68 00
3½		18		135	69 00
3⅞	4½	8		140	65 00
3⅞		10		150	66 00
3⅞		12		160	68 00
3⅞		14		170	70 00
3⅞		16		180	71 00
3⅞		18		190	75 00
4½	5	8	2 x 3	210	74 00
4½		10		215	75 00
4½		12		220	77 00
4½		14		225	79 00
4½		16		230	81 00
4½		18		240	83 00
4½		20		250	84 00
4½		22		260	86 00
4½		24		270	88 00
4½		30		280	93 00
4½		36		290	99 00
5¼	5⅝ or larger	8	2 x 3 or 2¼ x 3¼	300	84 00
5¼		10		310	86 00
5¼		12		320	89 00
5¼		14		330	91 00
5¼		16		340	93 00
5¼		18		350	95 00
5¼		20		360	97 00
5¼		22		370	100 00
5¼		24		380	102 00
5¼		30		390	108 00
5¼		36		400	115 00
5½	6½ or larger	8	2¾ x 3¾	330	90 00
5½		10	2¼ x 3¾	340	93 00
5½	6½ or larger	12	2¾ x 3¾	350	95 00
5½		14		360	97 00
5½		16		370	100 00
5½		18		380	102 00
5½		20		390	105 00
5½		22		400	107 00
5½		24		410	109 00
5½		30		420	117 00
5½		36		430	124 00
6¼	6½ or larger	8	2¾ x 3¾	470	108 00
6¼		10		500	111 00
6¼		12		530	114 00
6¼		14		560	116 00
6¼		16		590	119 00
6¼		18		620	122 00
6¼		20		650	125 00
6¼		22		680	128 00
6¼		24		710	130 00
6½	7⅝ or larger	8	2¾ x 3¾	500	115 00
6½		10		530	118 00
6½		12		560	121 00
6½		14		590	124 00
6½		16		620	127 00
6½		18		650	130 00
6½		20		680	133 00
6½		22		710	136 00
6½		24		740	139 00
7	8¼ or larger	8	2¾ x 3¾	620	128 00
7		10		640	132 00
7		12		660	135 00
7		14		680	139 00
7		16		700	142 00
7		18		720	145 00
7		20		740	149 00
7		22		760	152 00
7		24		780	156 00

When ordering, state size of box and pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

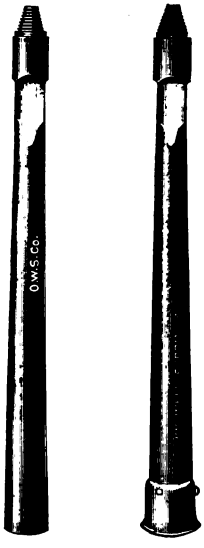
WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

HORN SOCKETS

Fig. 1750 Fig. 1752



Without bowl With bowl

To take friction hold of a loose tool in the well.

By putting on the bowl the socket can be used in a larger hole.

SLIP SOCKETS

Two sets of slips with each socket

Fig. 1786 Fig. 1788

Without bowl With bowl

When ordering, state size of tool the slips are to catch.

SQUARE SOCKET

Fig. 1789

For catching square of tool that has broken off below collar.

Prices on application

Size of hole - - - - - - inches	4 1/4	4 1/2	5	5 1/16	5 3/8	6 1/4	6 3/8	7 3/8	8 1/4	9 3/8	10
Size of pin - - - - - - - inches	1 1/8 x 2 1/4	1 1/8 x 2 1/4	2 x 3	2 x 3	2 1/4 x 3 1/4	2 1/2 x 3 1/2	2 1/2 x 3 1/2	2 1/2 x 3 1/2	2 1/2 x 3 1/2	2 1/2 x 3 1/2	2 1/2 x 3 1/2
Horn sockets, fig. 1750 - - - -	$14 50	16 00	18 50	21 00	21 50	25 00	27 00	31 00	33 00	38 00	39 50
Weight - - - - - - - - lbs.	**90**	**100**	**110**	**118**	**125**	**140**	**150**	**155**	**160**	**180**	**190**
Fig. 1752, with bowl for hole, inches	5 5/8	5 5/8	6 1/4	6 5/8	7 3/8	8 1/4	8 5/8	9 5/8	10	11 5/8	12
Price - - - - - - - - - -	19 50	21 00	24 50	27 00	30 50	35 00	39 00	43 50	47 00	56 00	60 00
Weight - - - - - - - - lbs.	**100**	**110**	**125**	**130**	**140**	**160**	**170**	**180**	**185**	**210**	**230**
Slip sockets, regular, fig. 1786 - -	$51 00	53 00	58 00	60 00	64 00	70 00	75 00	88 00	93 00	118 00	124 00
Weight - - - - - - - - lbs.	**100**	**110**	**130**	**140**	**150**	**200**	**230**	**300**	**350**	**400**	**450**
Slip sockets, ex. hy. with long reins -	- - -	- - -	- - -	- - -	- - -	100 00	107 00	128 00	140 00	168 00	176 00
Weight - - - - - - - - lbs.	- - -	- - -	- - -	- - -	- - -	**250**	**280**	**380**	**420**	**500**	**550**
Slip socket slips only - - per pair	$8 50	8 50	8 50	8 50	8 50	8 50	8 50	10 50	10 50	10 50	10 50
Slip socket cross bars - - - - -	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 50	2 50	2 50	2 50
Slip sockets with bowl, fig. 1788, for hole - - - - - - - - inches	5 5/8	5 5/8	6 1/4	6 5/8	7 3/8	8 1/4	8 5/8	9 5/8	10	11 3/8	13
Price - - - - - - - - - -	$63 00	65 00	72 00	76 00	81 00	89 00	98 00	110 00	120 00	146 00	156 00
Weight - - - - - - - - lbs.	**110**	**120**	**145**	**170**	**230**	**260**	**340**	**400**	**500**	**520**	**600**
Square sockets, fig. 1789 - - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Weight - - - - - - - - lbs.	100	110	120	150	200	230	300	350	400	450	- - -

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

SIDE SLOT COMBINATION SOCKET
Fig. 1760

To take hold of pin or neck of rope socket.

Working parts adjusted through the slots.

BOWL SPEAR
BULL DOG PATTERN
Fig. 1796

For taking inside hold of bowl or any hollow tool.

CASING BOWL
Fig. 1797

FRICTION SOCKET. Fig. 1754

To take hold of tools that are loose in well.

SIDE SLOT COMBINATION SOCKETS—Fig. 1760

Size of hole - - - - - - - - - - inches	4¼	4½	5	5 3/16	5⅝
Size of pin - - - - - - - - - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2 x 3	2¼ x 3¼
Weight - - - - - - - - - - lbs.	**70**	**75**	**100**	**110**	**125**
Price - - - - - - - - - - - - -	$42 50	47 00	52 00	54 00	58 00

Size of hole - - - - - - - - - - inches	6¼	6⅝	7⅝	8¼	9⅝
Size of pin - - - - - - - - - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Weight - - - - - - - - - - lbs.	**175**	**175**	**250**	**260**	**300**
Price - - - - - - - - - - - - -	$64 00	68 00	77 00	83 00	104 00

Slips - per set, $8 00

BOWL SPEAR—BULL DOG PATTERN—Fig. 1796

Weight, 75 lbs. - $36 50

CASING BOWLS, Fig. 1797

With two pairs of slips.

Size - - - - - - - - - - - - - inches	5⅝	6¼	6⅝	8¼	10
Weight - - - - - - - - - - - - lbs	------	------	**80**	**165**	------
Price - - - - - - - - - - - - - -	$70 00	80 00	80 00	95 00	125 00
Slips - - - - - - - - - - - - per pair	22 50	30 00	30 00	32 50	37 50

FRICTION SOCKETS, Fig. 1754

Size of hole - - - - - - - - - - - - inches	5	5⅝	6¼	6⅝
Size of pin - - - - - - - - - - - - inches	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾
Fig. 1754 - - - - - - - - - - - - -	$17 00	19 50	22 00	23 00
Weight - - - - - - - - - - - - - lbs.	**120**	**140**	**160**	**170**

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

COLLAR GRAB **COLLAR SOCKET**
Fig. 1806 **Fig. 1766**

The collar grab is to take hold of any loose tool just below the collar, when the pin is broken off.

The collar socket is to take hold of the collar of a tool.

6¼-INCH COLLAR GRAB, fig. 1806 - - - $76 50
Weight, 350 pounds.

COLLAR SOCKETS, Fig. 1766

Size of hole - inches	6¼	6⅝	7⅝	8¼	9⅝
Size of pin - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Price - - - - -	$60 00	65 00	94 00	103 00	117 00
Weight - - lbs.	**150**	**160**	**190**	**200**	**250**
Extra slips, per pair	8 50	8 50	11 00	11 00	11 00

Fig. 1770

DRIVE DOWN SOCKET

To reduce the battered neck of a rope socket so a combination socket can go over it.

Size of hole - - inches	4¼	4½	5	5⅝	6¼	7⅝	8¼	- -
Size of pin - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Weight - - - lbs.	- - -	- - -	- - -	**125**	**150**	- - -	- - -	- - -
Price - - - - -	- - -	- - -	- - -	$24 00	26 50	- - -	- - -	- - -

Fig. 1775

Fig. 1779

SIDE JAR SOCKETS

To catch one rein of broken jars.
When ordering, state width and thickness of rein.

Size of hole, inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝	8¼
Size of pin, inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Price - - - -	$44 50	46 00	50 00	55 00	60 00	62 50	70 00	75 00
Weight - lbs.	**100**	**120**	**130**	**150**	**175**	**175**	**200**	**250**

Slips - per pair, $8 50

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp) size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

CENTER JAR SOCKET
Fig. 1777

To catch both reins of broken jars.

Size of hole, inches	4¼	4½	5	5⅝
Size of pin, inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼
Center jar, fig. 1777	$41 00	43 00	47 50	53 00
Weight - - lbs.	**80**	**90**	**110**	**120**
Jar tongue, fig. 1781	$48 00	50 00	54 00	60 00
Weight - - lbs.	**40**	**50**	**60**	**80**
Jar tongue, fig. 1784	$50 00	52 00	56 00	62 00
Weight - - lbs.	**50**	**60**	**75**	**90**

Size of hole, inches	6¼	6⅝	7⅝	8¼
Size of pin, inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Center jar, fig. 1777	$58 00	61 00	69 50	75 00
Weight - - lbs.	**150**	**170**	**190**	**210**
Jar tongue, fig. 1781	$65 00	68 00	79 00	85 00
Weight - - lbs.	**100**	**110**	**140**	**160**
Jar tongue, fig. 1784	$67 00	70 00	81 00	87 00
Weight - - lbs.	**110**	**120**	**150**	**170**

Slips for figs. 1781-1784, per pair - - - - - - - - $8 50

When ordering, state width and thickness of reins.

JAR TONGUE SOCKETS
Fig. 1781 Fig. 1784

Without band.

With band.

To catch the tongue or fish tail of jars.

JAR KNOCKER OR BUMPER—Fig. 1851

Jar knockers are to knock jars loose when locked, or loosening tools that are stuck in the hole.

BALL BEARING JAR KNOCKER OR BUMPER—Fig. 1852

Length - - feet	8 to 10	12	14	16	18	20
Fig. 1851 - - - -	$25 00	28 00	31 50	35 00	38 50	42 00
Fig. 1852, B. B. -	32 00	35 00	38 50	42 00	45 50	49 00
Weight - - lbs.	**195**	**220**	**245**	**270**	**295**	**320**

SIDE LATCH JACK—Fig. 1811

BOOT JACK—Fig. 1812

Side latch jacks and boot jacks are to take hold of broken jars, also used as bailer grabs.

ALLIGATOR GRAB—Fig. 1810

To grip fragment of steel or other small articles lost or dropped in well.

Side latch jacks - $24 00 **Weight, 100 lbs.**
Boot jacks - - - 24 00 **Weight, 110 lbs.**

ALLIGATOR GRABS

Size - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝	8¼
Price - - -	$52 00	54 00	56 00	60 00	64 00	66 00	72 00	75 00
Weight, lbs.	**120**	**130**	**140**	**170**	**200**	**220**	**240**	**260**

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

Tools for cutting cable or rope in well

HORSE SHOE TRIP KNIFE
Fig. 1828

For cutting off cable close to the rope socket, will not cut until the trip strikes rope socket barrel, allowing the knife to fall. We recommend this as being the best rope knife.

Weight, 20 lbs.

HOOK ROPE KNIFE
Fig. 1839

Weight, 15 lbs.

V ROPE KNIFE
Fig. 1844

Weight, 15 lbs.

VALVE ROPE KNIFE
Fig. 1837

Weight, 20 lbs.

ROPE KNIFE SINKER
Fig. 1831

The sand line is tied in the eye; jars and rope knife screwed to the lower end.

Weight, 20 lbs.

KNIVES FOR CUTTING WIRE ROPE

MAPE'S PATENT
Fig. 1579

Wt., 40 lbs.

O. W. S. CO.
Fig. 1578

Wt., 20 lbs.

SUCKER ROD JARS
Fig. 1833

To attach to rope knife to cut rope in well, used on a string of sucker rods.

Wt., 20 lbs.

PIPE OR SWIVEL JARS
Fig. 1835

Figs. 1835 and 1845 are used with a rope knife to prevent the rope from twisting or kinking.

Wt., 20 lbs.

BALL BEARING SWIVEL FOR ROPE KNIFE
Fig. 1845

Wt., 10 lbs.

Horse shoe trip rope knife, fig. 1828	$22 50
Hook rope knife, fig. 1839	7 00
V rope knife, fig. 1844	9 25
Valve rope knife, fig. 1837	14 50
Mape's wire rope knife, fig. 1579	75 00
O. W. S. Co., wire rope knife, fig. 1578	$16 50
Sucker rod jars, fig. 1833	10 00
Swivel jars, fig. 1835	6 50
B. B. swivel jars, fig. 1845	7 00
Rope knife sinker, fig. 1831	4 50

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

Tools for removing broken cable or rope from well

ROPE GRABS

HALL PATENT
Fig. 1818

Fig. 1823

Two wing

Fig. 1825

Three wing

ROPE SPEARS

Fig. 1821

Fig. 1822

Side hole

ROPE CHOPPER

Fig. 1849

To chop rope in well so it may be removed by mouse trap or other tool.

MOUSE TRAP

Fig. 1847

For cutting and fishing out rope when matted in the well. It will also take out any small object.

Size of hold - - inches	4¼	4½	5	5 1/16	5⅝	6¼	6⅝	7⅝	8¼
Size of pin - - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Hall patent grab, fig. 1818	$48 00	50 00	53 00	54 00	55 50	60 00	61 50	66 50	70 00
Weight - - - - - lbs.	**120**	**135**	**150**	**160**	**175**	**200**	**210**	**240**	**260**
Two wing grab, fig. 1823 -	$31 00	34 00	40 00	42 00	46 00	53 00	57 00	68 00	75 00
Weight - - - - - lbs.	**90**	**95**	**100**	**110**	**120**	**150**	**160**	**170**	**185**
Three wing grab, fig. 1825	$49 00	51 50	57 00	59 00	66 50	70 50	74 50	85 00	90 00
Weight - - - - - lbs.	**100**	**110**	**120**	**130**	**150**	**180**	**190**	**200**	**220**
Rope spear, fig. 1821 - -	$25 50	26 00	27 00	27 50	29 00	30 00	31 00	34 00	35 00
Weight - - - - - lbs.	**90**	**100**	**110**	**130**	**140**	**150**	**150**	**160**	**175**
Rope spear, fig. 1822 - -	$57 00	59 00	63 00	65 00	68 00	73 00	76 00	84 00	89 00
Weight - - - - - lbs.	**90**	**100**	**110**	**130**	**140**	**150**	**150**	**160**	**175**
Rope chopper, fig. 1849 -	$34 00	35 50	38 50	40 00	42 50	46 00	48 00	54 00	58 00
Weight - - - - - lbs.	**110**	**120**	**130**	**140**	**150**	**180**	**200**	**220**	**250**

MOUSE TRAPS—Fig. 1847

5-inch, 8 feet long. **Weight, 190 lbs.** - - - - - - - - - - - - - - - - $38 50
6-inch, 8 feet long. **Weight, 220 lbs.** - - - - - - - - - - - - - - - - 43 50

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

PIPE SWEDGES

REGULAR
Fig. 1914

FLUTED
Fig. 1918

For opening a clear passage through collapsed pipe or casing

Size of hole - inches	4¼	4½	5	5⅝	6¼	6⅝
Size of pin - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾
Price - - - - - - -	$18 00	20 00	23 00	27 00	31 00	34 00
Weight - - - lbs.	**70**	**80**	**110**	**150**	**190**	**210**

Size of hole - inches	7⅝	8¼	9⅝	10	11⅝	12½
Size of pin - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Price - - - - - - -	$40 00	44 00	52 00	55 00	65 00	76 00
Weight - - - lbs.	**250**	**290**	**365**	**400**	**550**	**650**

TWIST DRILL

Fig. 1881

When the top of a lost tool has been battered so large that there is not room for a fishing tool to take hold. this tool drills a hole in the top of lost tool, in which hole is inserted the twist drill spear (fig. 1879).

Used on tubing.

Price - - - - - - - $35 00

Weight, 30 lbs.

TWIST DRILL SPEAR

Fig. 1879

To catch a lost tool in the hole made by the twist drill (fig. 1881). Used on drilling tools.

Price - - - - - - - $29 00

Weight, 50 lbs.

SAND PUMP OR BAILER GRAB

Fig. 1808

For taking hold of sand pump or bailer when lost in the well.

ROPE SOCKET SPEAR

Fig. 1814

ROPE SOCKET DRILL

Fig. 1816

To drill rope out of rope socket neck.

Price - - - - - - - - - $35 00

Size hole for - - - - - - - - - - inches	5	5⅝	6¼
Sand pump or bailer grab, fig. 1808 - - - - -	$28 00	31 00	34 00
Weight - - - - - - - - - - - lbs.	**130**	**150**	**180**
Rope socket spear, fig. 1814 - - - - - - -	$44 00	50 00	55 00
Weight - - - - - - - - - - - - lbs.	**100**	**125**	**150**

WELL DRILLING TOOLS

FOR CABLE SYSTEM

FISHING TOOLS

BIT HOOK
Fig. 1792

To loosen tools from side of well.

SPUD
Fig. 1798

For spudding around and loosening a bit or reamer when fast in the well, if disconnected from the rest of the tools. Length of blade, 8 feet. Longer spuds to order.

WHIP STOCK
Fig. 1803

Used in drilling past a "string" of lost tools. There is a hole in the bottom of the whip stock which goes over the end of the rope socket or pin. The whip stock guides the tools used in drilling past into the side of the well. Length, 10 feet.

Prices on application.

WHIP STOCK GRAB
Fig. 1804

For removing whip stock from well.

Weight, 200 pounds.

Price - $43 00

SPEAR
Fig. 1800

For spudding around and loosening the whole or a part of a string of tools when fast in the well. Lengths, 40 to 60 feet.

BIT HOOKS—Fig. 1792

Size of hole - - inches	5	5⅝	6¼	6⅝	7⅞	8¼	9⅝	10	12	13
Size of pin - - inches	2 x 3	2 x 3 or 2¼x3¼	2¾x3¾	2¾x3¾	2¾x3¾	2¾x3¾	2¾x3¾	2¾x3¾	2¾x3¾	2¾x3¾
Price - - - - - -	$27 00	30 00	32 00	34 00	38 00	41 00	46 00	48 00	58 00	60 00
Weight - - - - lbs.	125	150	180	200	250	290	350	360	400	450

SPUDS AND WHIP STOCKS

Size of hole - - - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅞	8¼	9⅝	10	11⅝	12
Spuds - - - - - - -	$33 00	35 00	39 00	45 00	50 00	53 00	61 00	67 00	78 00	82 00	95 00	99 00
Weight - - - - - lbs.	190	210	230	250	280	290	320	350	420	500	700	800

SPEARS—Fig. 1800

Length - - - - - - - - - - - - - - - - - feet	40	50	60
For 5⅝-inch hole, ¾ inch thick - - - - - - - - - - - - - - - -	$160 00	180 00	200 00
Weight - - - - - - - - - - - - - - - - - lbs.	575	715	850
For 6¼-inch hole, ⅞ inch thick - - - - - - - - - - - - - - - -	$175 00	195 00	215 00
Weight - - - - - - - - - - - - - - - - - lbs.	650	800	950

Spears are f.o.b. cars at Pittsburgh, Pa.

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square also diameter of hole in which tool is to be used.

WELL DRILLING TOOLS

Fig. 1853

FOR CABLE SYSTEM

MILLING TOOLS

When a pin is broken from a tool in the well it is sometimes desirable to cut a new pin to aid in its removal. The milling tools shown herewith are designed for that purpose. Figs. 1853 and 1855 are made to fit 2-inch tubing. Fig. 1855 is the latest design. The milling wheel, fig. 1992, is attached to the 2-inch tubing above the well mouth and a rope transmission, carried from the milling wheel to the bull wheel, provides the motive power necessary for cutting the pin. The milling jack holds the tubing in position and regulates the feed.

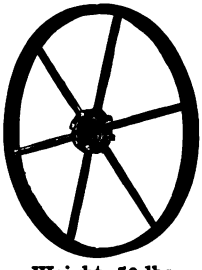
Fig. 1855

Solid

Size of hole, inches	4¼	4½	5	5 1/16	5⅝	6¼	6⅝	7⅝	8¼
Fig. 1853 - - -	------	------	$55 00	57 00	59 00	63 00	66 00	93 00	-----
Weight, - - lbs.	------	------	20	22	25	35	40	50	-----
Fig. 1855 - - -	$27 00	30 00	34 00	36 00	40 00	45 00	48 00	58 00	63 00
Weight, - - lbs.	20	20	23	28	45	58	60	80	85

SIDE RASP
Fig.1873

MILLING WHEEL
Fig. 1992



Weight, 50 lbs.
Price - - - - - - - $35 00

MILLING JACK AND WRENCH
Fig. 1993 Fig. 1993A

Weight, 390 lbs.
Price - - - - - - - $135 00

TWO-WING RASP
Fig.1874

A "milling job" has been regarded as one of the most difficult known to the trade, requiring unusual skill and caution. With the milling jack the time consumed is reduced from an average of two days to frequently less than two hours. The jack regulates the feed and sustains the weight of the tubing. It has ball bearings and can be operated with ease and accuracy.

RASPS

Figs. 1873-1874

For rasping off or reducing collars on lost tools, so that a fishing tool can take hold

Size of hole, in.	4¼	4½	5	5⅝	6¼	6⅝	7⅝	8¼
Size of pin - in.	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Side rasps - -	$35 50	37 00	41 00	45 00	50 00	53 00	60 00	65 00
Weight - lbs.	190	210	230	250	280	290	320	350
Two-wing rasps	$62 00	65 00	71 00	78 00	85 00	89 00	101 00	108 00
Weight - lbs.	150	180	230	350	420	450	480	510

TOOLS FOR REMOVING CASING FROM WELL

MACK'S PATENT TRIP CASING SPEAR—Fig. 1857

WRENCH FOR MACK'S PATENT SPEAR

Fig. 1858

Price - - - - - - - - - $1 75

SET FOR MACK'S PATENT SPEAR

Fig. 1859

Price - - - - - - - - - $1 00

If the casing cannot be pulled after taking hold with the trip spear, the spear can be released by jarring down.

FOX TRIP CASING SPEAR

Fig. 1861

BULL DOG CASING SPEAR

Fig. 1863-4

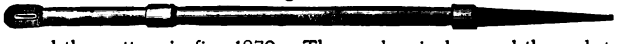
The Bull Dog spear will take a strong hold. *but will not let go.*

Size of casing - - - - - - - inches	3½	4¼	4½	5	5 3/16	5⅝	6¼
Size of pin - - - - - - - - inches	1⅜ x 2	1⅝ x 2½	1⅝ x 2½	2 x 3	2 x 3	2¼ x 3¼	2¾ x 3¾
Mack s spear, fig. 1857 - - - - - - -	$128 00	142 00	150 00	165 00	170 00	178 00	200 00
Weight - - - - - - - - - **lbs.**	----	----	----	----	**210**	**225**	**265**
Fox trip, fig. 1861 - - - - - - - -	$71 00	83 00	87 00	95 00	99 00	105 00	115 00
Weight - - - - - - - - - - **lbs.**	**50**	**60**	**80**	**110**	**130**	**140**	**220**
Extra slips for Fox trip spear - per set	$28 00	29 00	30 00	31 00	32 00	33 00	35 00
Bull Dog, fig. 1863 - - - - - - - -	45 00	55 00	58 00	65 00	68 00	74 00	82 00
Weight - - - - - - - - - - **lbs.**	**50**	**60**	**80**	**100**	**110**	**125**	**180**

Size of casing - - - - - - - inches	6⅝	7⅝	8¼	9⅝	10	11⅝	----
Size of pin - - - - - - - - inches	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	----
Mack's spear, fig. 1857 - - - - - - -	$220 00	257 00	275 00	315 00	325 00	----	----
Weight - - - - - - - - - - **lbs.**	**300**	**375**	**425**	**650**	**700**	----	----
Fox trip, fig. 1861 - - - - - - - -	$121 00	137 00	147 00	179 00	196 00	237 00	----
Weight - - - - - - - - - - **lbs.**	**250**	**320**	**360**	**425**	**450**	**580**	----
Extra slips for Fox trip spear - per set	$37 00	40 00	42 00	47 00	51 00	60 00	----
Bull Dog, fig. 1863 - - - - - - - -	87 00	101 00	109 00	128 00	133 00	155 00	----
Weight - - - - - - - - - - **lbs.**	**210**	**260**	**290**	**340**	**350**	**430**	----

WEDGE AND JAR FOR CASING CUTTER

Fig. 1872



To expand the cutters in fig. 1870. The wedge is lowered through tubing by means of small rope attached to eye in head.

CASING CUTTER

Fig. 1870

To cut casing at any point in the well when the entire "string" cannot be pulled. Used on tubing.

Size of casing to cut - - inches	3	4¼	4½	5	5 3/16	5⅝	6¼
Weight - - - - - - - - **lbs.**	**30**	**40**	**50**	**55**	**60**	**60**	**70**
Cutter, with wedge and jar, comp.	$49 00	52 00	54 00	58 00	60 00	62 00	67 00
Cutter wheels - - - - per set	5 50	5 50	5 50	5 50	5 50	5 50	5 50

Size of casing to cut - - inches	6⅝	7⅝	8¼	9⅝	10	11⅝	----
Weight - - - - - - - - **lbs.**	**80**	**90**	**100**	**110**	**120**	**140**	----
Cutter, with wedge and jar, comp.	$69 00	77 00	81 00	91 00	94 00	116 00	----
Cutter wheels - - - - per set	5 50	6 00	6 00	6 00	6 00	6 00	----

When ordering, state size of pin, style of taper, number of threads to inch (flat or sharp), size of wrench square; also diameter of hole in which to l is to be used.

Fig. 1860

SIDE VIEW—Showing method of setting slips

Fig. 1860-A

FRONT VIEW—Showing slips released from casing hold and locked to insure free passage from well

HENDERSON TRIP CASING SPEAR

The HENDERSON Casing Spear is constructed with all working parts enclosed in such a manner that gravel, sand or mud cannot interfere with its operation.

It can be set in one minute without taking spear apart.

It has a plunger instead of a mandrel and will positively trip without the difficulty usually encountered with spears of the mandrel type.

It will stand rough usage without damage to the inner working parts.

It can be repaired at less cost than any other trip spear on the market.

It may be used to swedge through the tight places in the casing.

An extra plunger is furnished "no charge", thus making the spear to catch any weight of a given size pipe or casing.

Its price is not higher than others, thus making it the most economical.

PRICE LIST

Size to catch	3 1/16"	Casing	-	each	$ 75 00	Size to catch	6 5/8"	Casing	-	each	$150 00
"	4 1/4"	"	-	"	90 00	"	7 5/8"	"	-	"	170 00
"	4 1/2"	"	-	"	105 00	"	8 1/4"	"	-	"	180 00
"	5"	"	-	"	120 00	"	9 5/8"	"	-	"	225 00
"	5 3/16"	"	-	"	125 00	"	10"	"	-	"	245 00
"	5 5/8"	"	-	"	130 00	"	11 5/8"	"	-	"	300 00
"	6 1/4"	"	-	"	140 00						

TOOLS FOR SPLITTING, PERFORATING, AND RE-CUTTING THREADS ON CASING IN WELL

CASING SPLITTER
Fig. 1867

Showing position of knives when lowered in well.

For splitting casing to let sediment around it run into well, so casing may be removed.

Fig. 1868

Showing action of friction loop forcing knives into casing.

CASING PERFORATOR
Fig. 1865

Showing position of perforators when the tool is being lowered into casing.

For perforating casing in well. Can be successfully operated at any depth.

Fig. 1865-A

Showing action of perforators.

MANDREL OR BELL SOCKET
Fig. 1876

To take hold of casing that has collapsed or parted.

A given size denotes the inside diameter of casing or pipe to be caught.

Size of casing - - - - - - inches	4¼	4½	5	5⅝	6¼	6⅝	7⅝	8¼	10	10⅝	12½
Size of pin - - - - - - inches	1⅝ x 2½	1⅝ x 2½	2 x 3	2¼ x 3¼	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾	2¾ x 3¾
Casing splitters, fig. 1867 - - - -	$59 00	61 00	66 00	72 00	78 00	81 00	90 00	96 00	---	---	---
Weight - - - - - - - - lbs.	**100**	**100**	**120**	**120**	**175**	**200**	**280**	**340**	---	---	---
Perforators, fig. 1865 - - - - - -	---	---	---	129 00	---	---	200 00	---	225 00	235 00	257 00
Weight - - - - - - - - lbs.	---	---	---	**250**	---	---	**375**	---	**700**	**750**	**950**
Mandrel or bell sockets, fig. 1876 - -	$49 00	51 00	57 00	65 00	72 00	77 00	88 00	96 00	---	---	---
Weight - - - - - - - - lbs.	**80**	**90**	**110**	**140**	**180**	**200**	**230**	**250**	---	---	---

CASE-HARDENED NIPPLE

Fig. 1856

Figs. 1856 and 1856-C have one end filed and case-hardened.

Will not stand much wear or abuse.

CASE-HARDENED COUPLING
Fig. 1856-C

Case-hardened and forged steel nipples are for re-cutting threads on casing or in casing couplings when lost in the well.

FORGED STEEL NIPPLE—Fig. 1856-A

The forged steel nipple has both ends filed and case-hardened.

Male and female

Are very serviceable; can be used a number of times.

Size - - - - inches	3	4, 4¼	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10	11⅝
Case-hardened nipples, - - - - fig. 1856	$2 50	2 85	2 85	3 15	3 75	3 75	4 00	4 60	5 25	5 50	7 25	9 50	11 00
Weight - - - lbs.	**8**	**9**	**10**	**12**	**13**	**14**	**15**	**17**	**20**	**20**	**28**	**32**	**34**
Case-hardened couplings	$1 75	2 00	2 15	2 25	2 40	2 60	3 00	3 25	3 75	4 25	6 25	7 00	8 75
Weight - - - lbs.	**2.5**	**3.9**	**4**	**5.7**	**5.9**	**6.4**	**7.9**	**9.7**	**14**	**15.4**	**24.5**	**26**	**30**
Forged steel nipples, - - - fig. 1856-A	$10 00	12 00	13 50	15 00	15 50	16 00	18 00	19 00	21 00	22 50	28 00	29 00	36 00
Weight - - - lbs.	**12**	**12**	**14**	**16**	**15**	**15**	**17**	**18**	**25**	**27**	---	---	---

TOOLS FOR DRAWING CASING OR PIPE FROM WELL

RING AND WEDGES—Fig. 1924

Used for pulling long strings of drive pipe or casing. The ring is heavy and capable of sustaining any weight. The wedges are cut from fine tool steel.

Size ring - - - - - - inches	4½	5⅝	6¼	6⅝	7⅛	8¼	10	12	13
With wedges - - - - - inches	4½, 4¼	5⅜, 4½	6¼, 5	6⅝, 5 3/16	7⅛, 5⅝	8¼, 6¼	10, 8¼	12, 10	13, 10
Price - - - - - - - - -	$73 00	91 00	101 00	107 00	122 00	132 00	160 00	191 00	207 00
Weight - - - - - - - lbs.	250	350	350	410	480	660	700	815	815

EXTRA WEDGES

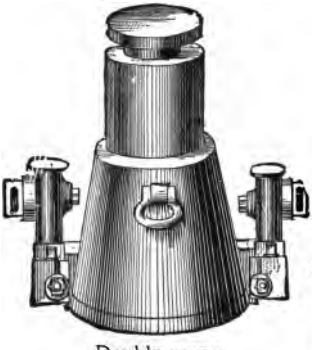
Size of wedges - - - inches	4¼, 4½	4½, 5⅝	5, 6¼	5 3/16, 6⅝	5⅝, 7⅛	6¼, 8¼	8¼, 10	10, 12	10, 13
Size rings for - - - - inches	4½	5⅝	6¼	6⅝	7⅛	8¼	10	12	13
Per set - - - - - - - -	$22 00	27 00	30 00	32 00	37 00	40 00	48 00	59 00	62 00
Weight - - - - - - - lbs.	27	60	65	75	85	95	120	180	190

HYDRAULIC JACKS

Fig. 1928 or 3145

Single pump

Fig. 1930 or 3147



Double pump

Fig. 3149

Used in connection with ring and wedges

Fig. 3149 was designed especially for pulling pipe or casing. Double piston single outside pump

Jack to lift, tons	Raise, inches	Total height, inches	Weight, lbs.	Single pump, Fig. 1928, each	Double pump, Fig. 1930, each
60	12	20½	360	$240 00	340 00
100	12	20½	460	300 00	400 00
125	12	20½	600	360 00	460 00
150	12	20½	800	425 00	525 00

DOUBLE PISTON SINGLE OUTSIDE PUMP. Fig. 3149

Jack to lift, tons	Raise, inches	Total height, in.	Weight, lbs.	Diam. of base, in.	Each
60	12	20½	380	12	$240 00
60	18	26½	430	13	260 00
100	12	20½	480	13	300 00
100	18	26½	580	14	340 00
125	12	20½	600	14	360 00
125	18	26½	700	15	400 00

PACKING FOR HYDRAULIC JACKS

"U"

Fig. 3153

CUP

Fig. 3155

Prices quoted upon application.

PULLING RING REST FOR HYDRAULIC JACKS

Fig. 3151

Per pair - - - - - - - - - - - - $5 00

FISHING TOOLS FOR PUMPING WELLS

TUBING SPEARS

COMMON Fig. 1888

WITH SOCKET Fig. 1884

WITH SHOE SOCKET Fig. 1886

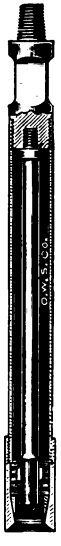
This spear is made with either tubing or tool thread.

COMBINATION Fig. 1895

To use with tubing. Prices on application.

COMBINATION TUBING & SUCKER ROD SOCKET Fig. 1896

With three sets of slips, to catch tubing, tubing collars or sucker rods.



SUCKER ROD SPEAR Fig. 1902

With ⅞-inch pin.

Size tubing to catch - - - - - - - - - - - - inches	2	2½	3
Common spear, fig. 1883 - - - - - - - - - - - - -	$17 00	19 50	21 50
Weight - - - - - - - - - - - - - - - - - - lbs.	**40**	**55**	**70**
Spear with socket, fig. 1884 - - - - - - - - - - - -	$34 50	39 00	43 00
Weight - - - - - - - - - - - - - - - - - - lbs.	**120**	**130**	**150**
Spear with shoe socket, fig. 1886 - - - - - - - - - - -	$36 00	42 00	46 00
Weight - - - - - - - - - - - - - - - - - - lbs.	**110**	**140**	**160**

COMBINATION TUBING AND SUCKER ROD SOCKET—Fig. 1896

Size of pin - - inches	2¼ x 3¼	2¾ x 3¾
Size of hole - - inches	5⅝	6¼
Price - - - - - -	$75 00	85 00
Weight - - - - lbs.	**120**	**150**

SUCKER ROD SPEAR Fig. 1902

Size sucker rods for - inches	1⅝	1⅝
Length in clear - - - feet	6	30
Price - - - - - - - - -	$7 50	17 50
Weight - - - - - - lbs.	**10**	**40**

Figs. 1671, 1890

TUBING SUB

Used to connect tubing with tools. Made with tubing thread on lower end.

Size of pin - - - inches	1⅝ x 2½	2 x 3	2¼ x 3¼	2½ x 3½	2¾ x 3¾
Each - - - - - - -	$7 00	9 00	10 00	11 50	12 50
Weight - - - - - -	**30**	**50**	**60**	**80**	**90**

FISHING TOOLS FOR PUMPING WELLS

SUCKER ROD SOCKETS

COMMON

Fig. 1904

COMBINATION

Fig. 1898

HITCHCOCK

Fig. 1894

SLIP SOCKET FOR IRON RODS

Fig. 1794

Size of rods - - - - - - - - - inches	1⅛	1⅞	1⅞	2¼	2¼
Size of tubing - - - - - - - - - - - -	2	2½	3	3	4
Common, fig. 1904 - - - - - - - - - - -	$3 50	-----	-----	5 00	-----
Weight - - - - - - - - - - - **lbs.**	**10**	-----	-----	**36**	-----
Combination, fig. 1898 - - - - - - - - -	$10 00	13 00	16 00	16 00	22 00
Weight - - - - - - - - - - - **lbs.**	**100**	-----	-----	-----	-----
Slips - - - - - - - - - - - - - - -	$4 00	-----	-----	-----	-----
Hitchcock, fig. 1894 - - - - - - - - - -	8 00	10 50	12 00	13 50	15 00
Weight - - - - - - - - - - - **lbs.**	**8**	**12**	**15**	-----	-----
Extra slips - - - - - - - - - - Per set	$0 75	-----	-----	-----	-----
Set screw - - - - - - - - - - - each	02	-----	-----	-	----

SLIP SOCKET FOR IRON RODS—Fig. 1794

Size of rods - - - - - - - - - - - - - - - - - inches	9/16	⅝	11/16
Weight - - - - - - - - - - - - - - - - **lbs.**	**3.5**	**3.5**	**7**
Regular socket - - - - - - - - - - - - - - - - -	$4 00	4 00	5 00
Special socket with three sets slips - - - - - - - - - - - -	7 00	7 00	----
Extra slips, per set of 3 - - - - - - - - - - - - - - - -	2 00	2 00	2 50
Extra springs - - - - - - - - - - - - - - - - - -	15	15	25

PENNELL & BRIGGS PATENT SUCKER ROD SOCKET

Size of rods - - - - - - - - - - - - - - inches	1⅞	1⅞	2¼	2¼
Size of tubing - - - - - - - - - - - - inches	3	4	3	4
Price - - - - - - - - - - - - - - - - -	$25 00	37 50	25 00	37 50
Extra slips - - - - - - - - - - - - - per set	4 00	5 00	4 00	5 00

BRANDON'S IMPROVED SUCKER ROD SOCKET

Complete with iron rod attachment - - - - - - - - - - - - - - - - - -	$13 00
Complete without iron rod attachment - - - - - - - - - - - - - - - - -	10 00
Lower valve spear -	2 00
Combination valve puller -	4 00

SLIP SOCKET

TO CATCH IRON RODS.—Pat. Mch. 21, 1905

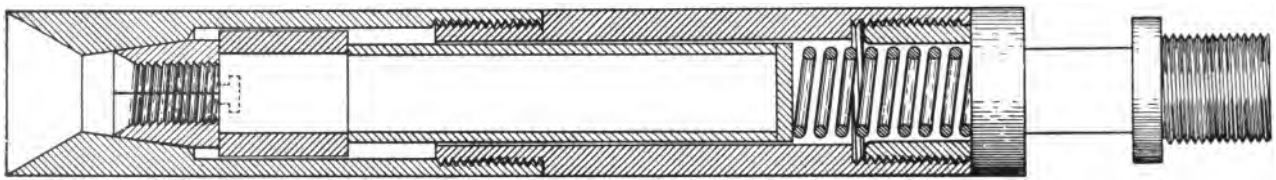


Fig. 1795

One set of slips will catch ¾, ⅝, and 9/16-inch rods. All pins made to fit ⅞-inch joint; can be used with any joint by adding a substitute.

Price each, 2-inch Tubing	$11 00
With Bowl for 3-inch Tubing	15 00

COMBINATION TUBING AND SUCKER ROD SOCKET

TO CATCH TUBING, TUBING COLLAR, AND SUCKER RODS

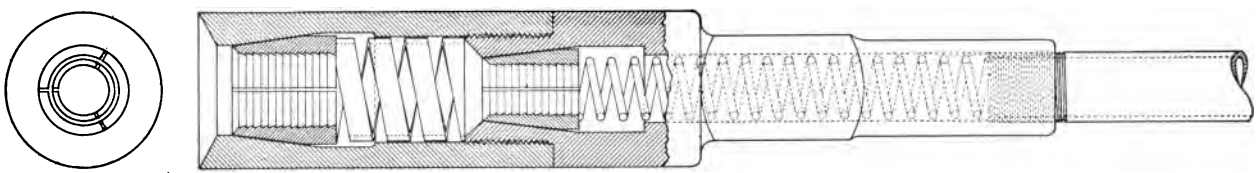


Fig. 1889

The lower slips will catch 2-inch Tubing and 2-inch Tubing Collar. The upper slips will catch wood and iron sucker rods 1⅝-inch and smaller.

LIST

Size, hole.	Weight, lbs.	Each	Size, hole.	Weight, lbs.	Each
5 inch,	—	$57 50	6¼ inch.	120	$65 00
5 3/16 "	—	60 00	6⅝ "	140	70 00
5⅝ "	80	62 00			

FISHING TOOLS FOR PUMPING WELLS

ROPE GRAB
Fig. 1906

With $\frac{7}{8}$-inch sucker rod pin
Weight, 10 lbs.

ROPE WORM
Fig. 1912

With $\frac{7}{8}$-inch sucker rod pin
Weight, 2 lbs.

PACKER RUBBER GRAB
Fig. 1908

With $\frac{7}{8}$-inch sucker rod pin
Weight, 8 lbs.

VALVE CUP GRAB
Fig. 1910

With $\frac{7}{8}$-inch sucker rod pin
Weight, 4 lbs.

Rope grab, fig. 1906	$11 50
Rope grab, fig. 1906, three-wing	15 00
Rope worm, fig. 1912	7 00
Packer rubber grab, fig. 1908	9 50
$1\frac{1}{4}$-inch valve cup grab, fig. 1910	7 00

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

CONDUCTOR BAILER

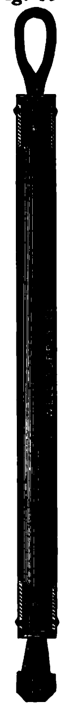
Fig. 1967

Diam., inches	Length, feet	Weight, lbs.	Price
10	5	- - -	$30 00
11	5	- - -	34 50

WROUGHT IRON BAILERS

REGULAR
Fig. 1625 or 1940

DOUBLE END
Fig. 1943



Made to order

BAILER BAIL

Fig. 1627

BAILER VALVE

Fig. 1628

WROUGHT IRON BAILERS

Diameter - - - - - - - - - - inches	2½	3	3¼	3½	3¾	4	4¼	4½
Diameter well used in - - - - inches	3¼	3½	4	4¼	4½	5	5	5⅝
Length of bailer, 19 feet - - - - - -	$11 50	14 00	15 50	17 00	- -	20 00	- -	23 00
Weight - - - - - - - - - - - - - lbs.	72	83	94	105	- -	126	- -	156
Length of bailer, 22 feet - - - - - -	- -	- -	- -	18 00	- -	21 50	- -	24 50
Weight - - - - - - - - - - - - - lbs.	- -	- -	- -	110	- -	142	- -	178
Length of bailer, 25 feet - - - - - -	- -	- -	- -	- -	- -	23 50	- -	27 00
Weight - - - - - - - - - - - - - lbs.	- -	- -	- -	- -	- -	158	- -	196
Bails, only - - - - - - - - - - - - -	$1 50	1 50	1 75	2 00	- -	2 25	- -	2 50
Weight - - - - - - - - - - - - - lbs.	3	4	4.5	4.7	5	5.5	6	6.5
Valves, only- - - - - - - - - - - - -	$3 75	5 50	6 00	6 75	- -	8 00	- -	9 50
Weight - - - - - - - - - - - - - lbs.	14	18	22	25	27	30	32	36
Diameter - - - - - - - - - - inches	5	5½	6	7	8	9	10	11
Diameter well used in - - - - inches	6¼	6⅝	7⅝, 8¼	8¼	10	- -	- -	- -
Length of bailer, 19 feet - - - - - -	$27 00	35 00	36 50	43 00	54 00	64 00	80 00	95 00
Weight - - - - - - - - - - - - - lbs.	182	228	238	287	340	433	540	630
Length of bailer, 22 feet - - - - - -	$28 50	37 50	39 00	46 00	58 00	68 00	82 50	105 00
Weight - - - - - - - - - - - - - lbs.	204	260	268	322	380	483	- -	- -
Length of bailer, 25 feet - - - - - -	$33 00	42 00	44 00	52 00	65 50	- -	- -	- -
Weight - - - - - - - - - - - - - lbs.	226	290	298	357	420	- -	- -	- -
Bails, only - - - - - - - - - - - - -	$3 00	3 00	3 25	3 50	5 00	5 50	6 50	7 50
Weight - - - - - - - - - - - - - lbs.	8	8.5	14	19	21	23	25	33
Valves, only - - - - - - - - - - - - -	$10 75	12 25	13 50	16 00	20 50	24 75	29 00	35 50
Weight - - - - - - - - - - - - - lbs.	44	52	61	89	115	145	160	190

For each band add extra to list for 4 inches and smaller - $1 50
For each band add extra to list for 4¼ to 5½ inch- 2 00
For each band add extra to list for 6 to 7 inch - 2 50
For each band add extra to list for 8 to 10 inch - 2 50

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

SECTIONAL FLUSH JOINT BAILER
Fig. 1948

(Three sections)

TOP AND BOTTOM
For casing bailer

Fig. 1944

Top

Fig. 1945

Bottom

Tubes 18 inches long attached to top and bottom, between which bailer tubes of desired number or length may be inserted.

GRAVITY BAILER
With one joint of pipe
Fig. 1950

SECTIONAL FLUSH JOINT BAILER—Fig. 1948

Size - - - - - - - inches	3	3½	4	4½	5	5½	6	7
Length - - - - - - - feet	40	40	40	40	40	40	40	40
Weight - - - - - - - - lbs.	**175**	**210**	**260**	**300**	**350**	**405**	**470**	**550**
Price - - - - - - - - - - -	$40 00	50 00	58 50	67 00	77 00	97 50	110 00	130 00
Connections or flush joints - each	8 50	10 50	12 50	14 50	16 50	18 50	22 50	27 00
Weight - - - - - - - - lbs.	**10**	**15**	**18**	**20**	**20**	**25**	**27**	**30**

TOP AND BOTTOM FOR CASING BAILER—Figs. 1944-5

Size of casing - - inches	4¼	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝	8¼
Price (top and bottom) - -	$17 50	19 50	22 00	22 50	25 00	27 50	30 50	36 50	43 50
Weight - - - - - lbs.	**50**	**60**	**80**	**90**	**100**	**110**	**120**	**130**	**140**

Fig. 1630

BAILER DUMP

To lower water into a well that is liable to cave if water is poured in from the top in the ordinary way.

Fastened to bailer dart with bolt, and sufficient tubing screwed on below to dump at desired point.

Price - $7 00

Weight, 15 lbs.

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

SAND PUMPS

MORAHAN PATENT SAND PUMP
Fig. 1956

PLUNGER FOR MORAHAN PUMP
Fig. 1957

MORAHAN SAND PUMP BOTTOM
Fig. 1959

With iron clapper

MORAHAN BOTTOM
Fig. 1961

With leather clapper

SMITH OR COMBINATION
Fig. 1971

List same as Morahan

ROBERTS' PATENT
Fig. 1973

List same as Morahan

Size - - - - inches	2½	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Size hole for - inches	3¼	4¼	4⅝	4⅞	5	5⅝	6	6¼	6⅝	7⅞. 8
Morahan pumps - - -	$13 00	13 50	14 00	14 50	16 00	18 00	18 50	19 00	20 00	21 00
Weight - - - - lbs.	52	65	74	82	90	105	110	112	125	132
Morahan plungers only -	- -	$6 00	6 00	6 00	7 50	7 50	8 00	8 00	8 00	9 50
Weight - - - - lbs.	- -	24	30	36	36	48	48	48	48	50
Bottoms, figs. 1959-61										
Bottoms, malleable iron	- -	$1 00	1 00	1 00	1 50	1 50	1 50	1 50	1 50	1 75
Weight - - - - lbs.	- -	3	4	4	5	5	5	6	6	7
Bottoms, wrought iron -	- -	$5 75	6 00	6 00	6 25	6 25	6 25	6 25	6 25	6 75
Weight - - - - lbs.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bottoms, brass - - -	- -	$4 50	4 75	4 75	5 50	6 25	6 25	6 25	8 00	8 00
Weight - - - - lbs.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Size - - - - inches	5 3/16	5⅝	6¼	6⅝	7⅝	8¼	8⅝	9⅝	10⅝	11⅝
Size hole for - inches	8, 8¼	8, 8¼	8¼, 9⅝	10	12	14	14	14	14, 16	14, 16
Morahan pumps - - -	$22 50	23 00	29 00	46 00	53 00	- -	- -	72 00	- -	- -
Weight - - - - lbs.	142	146	182	240	250	- -	- -	- -	- -	- -
Morahan plungers only -	$9 50	9 50	12 00	12 00	19 00	- -	- -	22 00	- -	- -
Weight - - - - lbs.	57	57	64	75	84	90	- -	- -	- -	- -
Bottoms, figs. 1959-61										
Bottoms, malleable iron	$2 00	2 00	3 50	3 50	4 00	5 00	- -	6 00	7 50	- -
Weight - - - - lbs.	7	8	20	20	24	- -	- -	- -	- -	- -
Bottoms, wrought iron -	$6 75	6 75	8 00	12 00	16 50	- -	20 00	- -	- -	- -
Weight - - - - lbs.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bottoms, brass - - -	$8 50	8 50	- -	- -	- -	- -	- -	- -	- -	- -
Weight - - - - lbs.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

SUCKER VALVES FOR MORAHAN SAND PUMPS

Not illustrated

Size pump for - - - - - - - - - - inches	3, 3¼, 3½	4, 4½	5	5⅝
Each - - - - - - - - - - - - - - - - - -	$0 60	75	85	1 00

SAND PUMP BAILS

Not illustrated

Fig. 1964

Size pump for - - - inches	3	3¼	3½	3¾	4	4¼	4½
Morahan or Robert's - - - -	$4 25	4 50	4 50	4 75	5 50	5 75	5 75
Weight - - - - - - lbs.	**8**	**9**	**9**	**10**	**10**	**10**	**10**

Size pump for - - - inches	4¾	5	5 1/16	5⅝	6¼	6⅝	7⅝
Morahan or Robert's - - - -	$6 50	6 50	7 00	7 00	7 75	12 00	13 25
Weight - - - - - - lbs.	**16**	**18**	**18**	**18**	**24**	**24**	**36**

CHICKERING PATENT SAND PUMP—Fig. 1964

Size - - - -in.	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Size hole for, in.	4¼	4½	4⅞	5	5½	5⅝	5⅝, 6	6	6¼
Price - - - -	$17 00	17 00	19 00	21 00	21 50	23 00	25 00	26 00	26 50
Weight - - lbs.	**59**	**67**	**75**	**88**	**88**	**90**	**92**	**108**	**114**

Size - - - -in.	5 1/16	5⅝	6¼	6⅝	7⅝	8⅝	9⅝	11⅝	------
Size hole for, in.	6⅝	7⅝, 8	8⅝	9⅝	10	12, 14	------	------	------
Price - - - -	$28 00	29 50	38 00	44 00	57 00	61 00	67 00	159 00	------
Weight - - lbs.	**140**	**150**	**155**	**186**	**260**	**320**	**380**	**486**	------

SAND PUMP JARS OR PLUNGERS

Not illustrated

Size pump for - inches	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Chickering's, complete with sucker valve - -	$9 50	9 50	10 75	11 75	12 00	12 75	13 75	14 00	15 00
Robert's - - - - - -	5 00	5 00	5 00	6 50	6 50	7 00	7 50	7 50	7 75

Size pump for - inches	5 1/16	5⅝	6¼	6⅝	7⅝	8¼	9⅝	11⅝	-----
Chickering's, complete with sucker valve - -	$15 50	15 50	22 00	25 00	33 00	34 00	40 00	46 00	-----
Robert's - - - - - -	8 50	8 50	9 50	10 00	11 00	12 00	-----	-----	-----

SWIVEL TOP SAND PUMP BAIL

Not illustrated

Fig. 1969

Size - - - - - - - - - - inches	5⅝	6¼	6⅝	7⅝
Price - - - - - - - - - - - - - -	$13 50	16 50	17 00	21 00

BANNISTER SAND PUMP VALVE—Fig. 1969

Size pump for - inches	3	4	4½	5	5⅝	7⅝	8	9⅝
Wrought iron - - - -	$17 50	-----	21 75	24 00	25 50	36 00	36 00	46 00
Malleable iron - - - -	1 50	1 50	-----	2 00	2 50	-----	-----	-----

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

MODEL SAND PUMP

Fig. 1632 or 1953

Fig. 1631 or 1952

MODEL SAND PUMP BOTTOM

Fig. 1633 or 1954

CALIFORNIA SAND PUMP BOTTOM

Fig. 1962

MODEL SAND PUMP AND PARTS

Diameter - - inches	3¾	4	4½	5	5½	6	7	8	9	10
Size hole for, inches	5	5	5 1/16, 5⅜	5⅝, 6¼	6¼, 6⅝	7⅝, 8	8, 8¼	10	10, 11⅝	13
Weight - - - lbs.	**150**	**180**	**215**	**230**	**250**	**275**	**350**	**400**	**500**	**550**
Complete - - -	$35 00	35 00	42 50	45 00	47 50	50 00	52 50	60 00	62 50	65 00
Bottoms comp. -	20 00	20 00	21 00	22 50	23 50	25 00	27 50	32 50	34 00	35 00
Upper valves - -	2 50	2 75	3 00	3 50	4 00	4 50	5 00	6 00	7 00	8 00
Lower valves - -	3 50	4 00	4 25	4 50	5 00	5 50	6 25	7 00	8 00	9 00
Springs - - - -	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Wrenches - - -	75	75	75	75	75	75	75	75	75	75

CALIFORNIA SAND PUMP

Size of pump - - - - - - inches	4½	5⅝	7⅝	9⅝	11⅝
Length of pump - - - - - - feet	20	20	16	10	6
Pumps complete - - - - - - -	$23 50	33 00	42 00	47 00	53 00
Weight - - - - - - - - lbs.	**150**	**230**	**250**	**310**	**270**
Bottoms only, fig. 1962 - - - - -	$9 00	11 00	15 50	19 00	27 00
Bails only - - - - - - - -	70	1 50	2 75	3 75	5 00

WELL DRILLING TOOLS

FOR CABLE SYSTEM

WELL CLEANING TOOLS

Fig. 1977

BRADEN PATENT SAND PUMP

Fig. 1991

MOODY PATENT SAND PUMP

Prices on application

Fig. 1983

COMBINATION BIT AND MUD SOCKET

Fig. 1986

MUD SOCKET

Fig. 1935

REGULAR SWAB

Fig. 1936

IMPROVED PATTERN SWAB

BRADEN'S PATENT SAND PUMP—Fig. 1977

5 inches diameter, 16 feet long, for $5\frac{5}{8}$-inch hole - $50 00 | Bottom only - - - - $7 00

Size of hole for - - - - - - - - - - - - - - - - - inches	5	$5\frac{5}{8}$ and larger
Diameter of pump - - - - - - - - - - - - - - - - inches	3	4
Combination bit and mud socket - - - - - - - - - - - - -	$46 50	57 50
Weight - - - - - - - - - - - - - - - - - - - lbs.	**210**	**260**
Mud socket, fig. 1986 - - - - - - - - - - - - - - - - -	$40 00	51 00
Weight - - - - - - - - - - - - - - - - - - - lbs.	**190**	**230**

SWABS

Size of hole - - - - - - - inches	$4\frac{1}{2}$	5	$5\frac{3}{16}$	$5\frac{5}{8}$	$6\frac{1}{4}$	$6\frac{5}{8}$
Size of pin - - - - - - - - - - -	$1\frac{5}{8}$x$2\frac{1}{2}$	2 x 3	2 x 3	$2\frac{1}{4}$ x $3\frac{1}{4}$	$2\frac{3}{4}$ x $3\frac{3}{4}$	$2\frac{3}{4}$ x $3\frac{3}{4}$
Regular, complete, fig. 1935 - - - - -	.....	$25 00	26 50	28 00	31 00	33 00
Weight - - - - - - - - - - lbs.	.....	**75**	**80**	**95**	**130**	**140**
Complete, less pin - - - - - - - -	.....	$14 00	15 50	16 50	17 50	19 50
Rubbers only - - - - - - - - - -	.....	7 50	8 50	9 25	11 00	13 50
Improved pattern, complete - - - - -	$24 00	25 00	26 50	28 00	31 00	33 00

THE HYDRAULIC ROTARY PROCESS

For sinking deep wells is superior to all others when used in formations composed of clay, sand, or quicksand.

This process is used almost exclusively in the Texas and Louisiana oil fields and to a large extent in other localities where the conditions are suitable.

The operation consists in rapidly turning a column of pipe, the lower end of which is armed with a steel shoe having a serrated edge for cutting the formation through which it passes.

Water is kept under constant high pressure in the pipe and the detritus is thus forced to the surface, passing up on the outside of the pipe with the water.

By this means it is possible to sink a column of casing through the most stubborn beds of quicksand or other soft formations, which will not, through their lack of stability, admit of the usual procedure of first drilling the hole and then lowering the casing to form the final and lasting wall for the well.

In cases where the formation is composed of clay of sufficient density to retain the wall of the well in place, a smaller pipe is used, armed with a perforated bit, through which the water is forced in same manner, and when the depth is reached where it may be desirable to insert the casing, the drilling pipe is removed and the casing is inserted in the hole thus prepared for it.

The illustration on page 188 is a reproduction from a photograph of a Hydraulic Rotary Drilling outfit in actual operation.

The boiler is not shown, as it was set up at a distance of about fifty feet from the engine in order to avoid accidents occurring from a premature flow of oil or gas.

The suction pipe was raised to show the foot valve and strainer.

A DRILLING OR BORING PLANT FOR THE HYDRAULIC ROTARY SYSTEM

INCLUDES

The derrick, see page 188, and the following list of machinery and tools:

ARTICLE	Fig. No.	Weight, lbs.
1 30-horse-power boiler	1400	7,800
1 23-horse-power engine	1425	3,900
1 12-inch rotary table	2190	1,900
1 hoisting gear or draw works	2191	2,000
2 8 x 5 x 10 duplex pumps	- - -	3,000
2 b. b. water swivels	2192	450
4 20-inch bushed derrick pulleys	2204	250
100 feet No. 103 sprocket chain	2200	350
1 sprocket wheel for engine	- - -	60
3 forged steel bushings, 6 x 4	- - -	138
2 forged steel bushings, 8 x 4	- - -	124
2 forged steel bushings, 10 x 4	- - -	130
2 forged steel bushings, 12 x 4	- - -	160
60 feet 2-inch wire wound rotary hose	2193	129
2 sets rotary hose couplings	- - -	10
7 rotary drills, 2 6-inch, 2 8-inch, 1 10-inch, 1 12-inch, 1 15-inch	2197	400
3 rotary shoes, 6-inch, 8-inch, 10-inch	2196	175
2 slide tongs, 4-inch, 6-inch	2194	230
1 2½-inch strapped C-hook	2201	70
5 sets elevators, 4-inch, 6-inch, 8-inch, 10-inch, 12-inch	2499	1,490
6 sets Vulcan tongs, No. 15, No. 14, No. 13 (two each)	5130	195
1 3½-inch round iron D. S. hook	2535	130
1 28-inch triple iron block	2519	350
600 feet ¾-inch steel casing line	1533	535
1,400 feet $\frac{7}{16}$-inch steel sand line	1526	520

Miscellaneous tools, fittings, etc.

Total estimated weight, 27,196 lbs.

The estimated value of the foregoing (less derrick) is $3,225, f. o. b. cars at Pittsburgh.

The outfit is intended for use with heavy line pipe, see page 127. Sizes, 12-inch, 10-inch, 8-inch, 6-inch. 4½-inch.

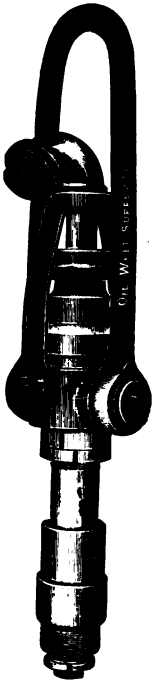
These sizes may be varied, but the bits, shoes and bushings must be made to conform to such changes.

Reproduction from photograph of an oil well in Texas, drilled by the rotary process

WELL DRILLING TOOLS

REVOLVING AND JETTING SWIVEL

Fig. 2213



HYDRAULIC HOSE COUPLING

Fig. 2214

Size - - - inches	1½	2	2½	3
Per set of 4 pieces -	$5 00	7 50	10 00	12 50
Coupling only, each	1 50	2 25	3 00	3 75
Clamp " "	1 00	1 50	2 00	2 50

2 -inch jetting swivel, O. W. S. pattern - - - - - - - - - - - - - - - - - -	$90 00
2½-inch jetting swivel, O. W. S. pattern - - - - - - - - - - - - - - - - - -	115 00
3 -inch jetting swivel, O. W. S. pattern - - - - - - - - - - - - - - - - - -	140 00

All less bushings.

PRESSURE HOSE, WIRED

Fig. 2193

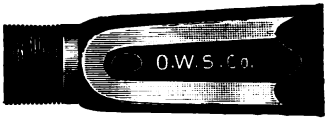
Each outfit requires two 30-foot sections of 2-inch wired hose with couplings.

30-foot section, 2 inch, 5-ply wired pressure hose with couplings - - - - - - -		$37 50
2-inch, 5-ply wired pressure hose -	per foot	1 00
Couplings -	per set of 4 pieces	7 50

WELL DRILLING TOOLS

ROTARY DRILL
Fig. 2197

HYDRAULIC AND JETTING ROCK DRILL
Fig. 2198



Size pipe drills pass through - - - inches	4	4½	5	6	7	8	9	10	12
Size pipe screws to, inches	2	2	2½	2½	3	3	3	4	4
Fig. 2197 - - - - - - -	$6 30	9 20	10 00	13 50	16 00	20 00	27 00	35 00	42 00
Fig. 2198 - - - - - - -	8 50	10 00	12 00	15 00	20 00	27 00	32 00	39 00	47 00

Fig. 2199

DRIVE PLATE

Will drive pipe - sizes	2 to 3	3 to 4½	3 to 6	4 to 7	4½ to 9
Price - - - - - - -	$2 50	3 40	5 80	7 50	10 00

SPROCKET CHAIN

Fig. 2200

Fig. 2220

Chain Number	Working strain, lbs.	Equivalent in single leather belt	Links per foot	Per foot
Fig. 2200 - - -	1,800	14	3.9	$0 67
Fig. 2220 - - -	3,000	23	3.9	1 00

SPROCKET WHEELS—No. 103

Diameter at chain center - - - inches	7	8	9	10	12	14	16
Number of teeth - - - - - - - - -	7	8	9	10	12	14	16
Price - - - - - - - - - - - - - -	$2 50	3 00	3 20	3 50	4 00	4 70	5 25
Diameter at chain center - - - inches	18	20	23	30	36	48	60
Number of teeth - - - - - - - - -	18	20	23	30	36	48	61
Price - - - - - - - - - - - - - -	$6 00	7 25	9 50	11 50	15 00	24 00	40 00

WELL DRILLING TOOLS

HYDRAULIC ROTARY SYSTEM

SLIDE TONGS
Fig. 2194

SWIVEL BUSHING
Fig. 2195

ROTARY SHOE
Fig. 2196

SLIDE TONGS

Size pipe for, inches	2½	3	3½	4	4½	5	6	8	10
Price	$9 00	11 00	12 50	14 00	16 00	18 00	21 00	30 00	35 00

SWIVEL AND REVOLVING PIPE BUSHINGS

Size pipe screws to - inches	2½	3	3½	4	4½	5	6	7	8	10	12
Swivel bushings, fig. 2195	$2 30	3 25	4 80	6 00	8 00	10 00	13 00	17 00	22 00	-----	-----
Revolving pipe bushings	-----	2 50	3 00	3 50	4 00	5 00	7 00	10 00	14 00	19 00	25 00

ROTARY SHOES—Fig. 2196

Size pipe screws to, inches	TOOL STEEL		MACHINE STEEL, CASE HARDENED	
	Standard length	Extra length	Standard length	Extra length
2½	$8 80	$11 80	$5 40	$7 60
3	9 60	13 00	6 60	8 80
3½	10 70	14 30	8 20	11 00
4	12 00	16 00	9 50	12 50
4½	13 50	18 50	11 00	14 50
5	15 50	20 50	12 00	16 00
6	17 50	23 00	13 50	18 00
7	20 00	27 00	15 00	20 00
8	22 50	30 00	17 00	23 00
9	29 00	39 00	22 00	29 00
10	36 00	50 00	27 00	36 00
12	64 00	84 00	48 00	64 00

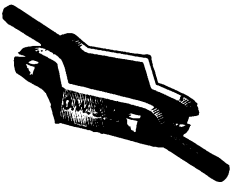
WELL DRILLING TOOLS

HYDRAULIC ROTARY SYSTEM

STRAPPED C-HOOK
Fig. 2201

SWIVEL
Fig. 2202

CLAMP
Fig. 2203



BACK PRESSURE VALVE
To go between pipe couplings
Fig. 2205

FOOT VALVE
Fig. 4968

Style, 6 inch and smaller

FOOT VALVE
Fig. 4969

Style, 7 inch and larger

2½-inch strapped C-hook, fig. 2201 - $10 00

SWIVELS—Fig. 2202

Size pipe screws to - - - - inches	1	1¼	1½	2	2½	3
Price - - - - - - - - - - - -	$4 50	6 00	7 50	9 00	12 00	15 00

CLAMPS—Fig. 2203

Size pipe for, inches	2½	3	3½	4	4½	5	6	7	8	9	10	12
Price - - - - - -	$3 50	4 00	4 50	5 00	6 00	7 00	8 00	9 00	10 00	12 00	14 00	25 00

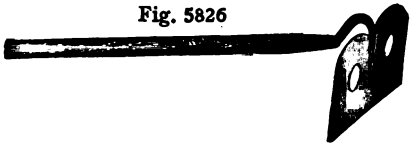
BACK PRESSURE VALVES—Fig. 2205

Size - - - - - - - - - - - inches	4	6	8	9	10	12
Price - - - - - - - - - - - -	$1 50	2 00	2 50	2 75	3 00	3 50

FOOT VALVES—Figs. 4968-4969

Size - - - - inches	2½	3	3½	4	4½	5	6	7	8	10	12
Price - - - - - - -	$3 30	3 90	5 60	7 30	10 50	11 25	14 75	35 00	41 00	64 00	100 00

Fig. 5826



MORTAR HOES

No.	Socket	Handles	Price
8	10-inch	6 feet	$2 20
9	9-inch	5½ feet	2 05

WELL DRILLING TOOLS

CANADIAN POLE TOOL SYSTEM

TAPER JOINT

FOR WOODEN DRILL POLES

Figs. 2059 or 2833

Number	21	22	23	24	25	26	27	28	29
Size of box and pin, taper joint, in.	¾x1¼	¾x1¼	⅞x1⅛	⅞x1⅛	1x1½	1x1½	1¼x1¾	1¼x1¾	1¼x1¾
Number of threads - - per inch	-----	-----	7	7	6	6	6	6	6
Size of wood - - - - inches	1⅞	2	2	2⅛	2¼	2½	2½	2¾	3
Number rivet holes - - - - -	5	5	5	5	5	5	5	5	5
Diameter of rivet - - - inches	5/16	5/16	3/8	3/8	3/8	3/8	3/8	7/16	7/16
Length of rivet - - - inches	2⅜	2½	2½	2 5/16	2 5/16	3 5/16	3 7/16	-----	-----
Size of square for wrench, inches	1	1	1¼	1¼	1¼	1¼	1⅜	1⅜	1⅜
Length of straps - - - inches	19	19	19	19	19	19	19	20	20
Total length of joint - - inches	45	45	50	50	50	50	50	55	55
Nominal weight - - - - lbs.	**15**	**15**	**21**	**21**	**21**	**22**	**22**	**26**	**26**
Price - - - - - - - - - -	$2 00	2 00	2 25	2 25	2 50	2 50	2 75	3 00	3 75

WOODEN DRILL POLE WITH JOINTS AND SPLICE—Fig. 2057

Plain white ash drill poles only, hexagon or round.

2⅛ or 2¼ inch x 18 feet, each - $1 25

SPLICE FOR WOODEN DRILL POLE

Figs. 2067 or 2849

Size rods for - - - - - - inches	2	2⅛	2¼	2½
Per set - - - - - - - - - - -	$0 50	50	50	50

STUB TAPER JOINT

FOR WELDING ON IRON POLES

Figs. 2062 or 2847

Number - - - - - - - - - - -	61	63	65	67
Size of box and pin - - - inches	¾ x 1¼	⅞ x 1⅛	1 x 1½	1¼ x 1¾
Threads - - - - - - - - per inch	-----	7	6	6
Size of rod, hollow - - - inches	-----	1¼	-----	1¼
Size of rod, solid - - - - inches	¾	-----	1	-----
Size of square for wrench - inches	1	1¼	1¼	1⅜
Length of joint - - - - inches	9½	11	11	14
Nominal weight - - - - - lbs.	**3**	**5**	**7**	**10½**
Price - - - - - - - - - - -	$0 85	95	1 10	1 40

WELL DRILLING TOOLS

CANADIAN POLE TOOL SYSTEM

ROUND REAMER
Fig. 2082

DRILLING BITS
Are sold in pairs or sets of two
Fig. 2085

For large hole

Fig. 2087

For small hole

TOOL WRENCH
Fig. 2089

SWIVELS FOR WIRE LINES

Fig. 2092

Fig. 2093

CASING SWIVELS

Fig. 2108

For 5⅝-inch

Fig. 2109

For 3½-inch

JARS

Fig. 2103

Fig. 2104

SURFACE AUGER
Fig. 2099

CHAIN LEVER
Fig. 2097
For tool wrench

SUBSTITUTES

Fig. 2113

Fig. 2114

Fig. 2115

Prices for Canadian pole tools will be furnished on specification.

WELL DRILLING TOOLS

CANADIAN POLE TOOL SYSTEM

TWO-LEG SOCKETS

Fig. 2149

With two dogs

Fig. 2145

With four dogs

Fig. 2147

With bonnet

HALF TURN SOCKET

Fig. 2159

Has two dogs with springs

Fig. 2156

ONE-LEG SOCKET

Fig 2153

UNDER REAMER

Fig. 2161

BELL MOUTH DUTCHMAN

Fig. 2163

With bell for 7¼-inch casing

BELLS FOR BELL MOUTH DUTCHMAN

Fig. 2164

For 5⅝-inch casing

Fig. 2165

For 4¼-inch casing

Prices for Canadian pole tools will be furnished on specification.

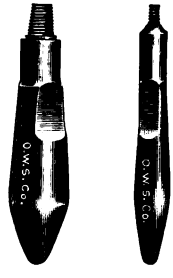
WELL DRILLING TOOLS

CANADIAN POLE TOOL SYSTEM

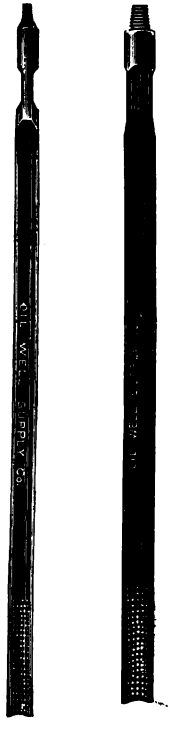
REAMING GUIDE
Fig. 2118

WRENCH BLOCK
Fig. 2120

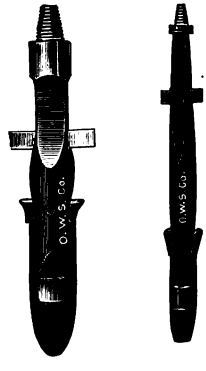
PIPE SWEDGES
Fig. 2131 **Fig. 2133**



SPUDS
Fig. 2123 **Fig. 2124**

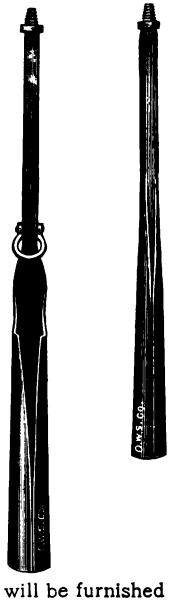


CASING DOGS
Fig. 2136 **Fig. 2138**



FRICTION SOCKET
Fig. 2128

HORN SOCKETS
Fig. 2140 **Fig. 2142**



DRIVE OR DRAW HEAD
Fig. 2151

Made for any size pipe or casing

Prices for Canadian pole tools will be furnished on specification.

WELL DRILLING TOOLS

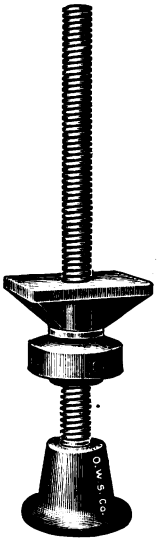
CANADIAN POLE TOOL SYSTEM

MUD PUMP
Fig. 2171

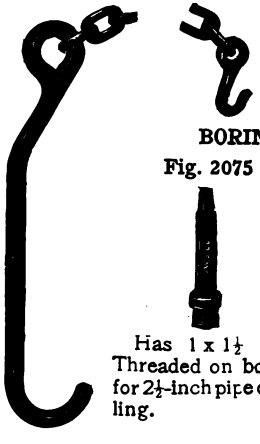
SAND PUMP OR BAILER
Fig. 2176

CASING OR PIPE CLAMPS
Fig. 2181

SCREW JACK
Fig. 2187



SAND PUMP HANGER CHAIN AND GRAB HOOK
Fig. 2177



SWING JOINT FOR DUMPING MUD PUMP
Fig. 2173

BORING STEM SUBS

Fig. 2075

Has 1 x 1½ pin. Threaded on bottom for 2½-inch pipe coupling.

Fig. 2077

Has 1 x 1½ pin, 2x3 inch 8-thread box.

CATCH WRENCH
Fig. 2079

POLE HOLDER
Fig. 2070

POLE TURNER
Fig. 2072

Prices for Canadian pole tools will be furnished on specification.

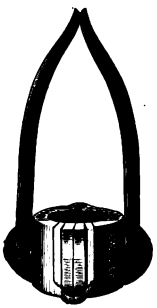
ELEVATORS, WROUGHT IRON

SCOTT'S PATENT
Regular
Fig. 2495

Mannington pattern
Extra heavy
Fig. 2497

FAIR'S PATENT
Regular
Fig. 2499

Mannington pattern
Extra heavy
Fig. 2501



FISHER'S PATENT
Regular
Fig. 2503

Mannington pattern
Extra heavy
Fig. 2505

To lower or elevate pipe, tubing, or casing into or out of the well.

When ordering, state size and whether for pipe, tubing, or casing.

PER SET OF TWO

Size - - - - - - - inches	1	1¼	1½	2	2½	3	3½	4	4½
Scott's regular, fig. 2495 - set	$13 00	14 00	15 00	19 00	---	---	---	---	32 50
Weight, per set - - - - lbs.	44	44	49	100	---	---	---	---	132
Fair's regular, fig. 2499 - set	$13 00	14 00	15 00	19 00	20 50	20 50	21 00	22 00	32 50
Weight, per set - - - - lbs.	60	65	70	80	88	100	110	110	104
Fair's Mannington pattern - set	---	---	---	29 50	---	47 50	47 50	50 00	50 00
Weight, per set - - - - lbs.	---	---	---	160	---	174	174	188	188
Fisher's regular, fig. 2503, set	$13 00	14 00	15 00	19 00	---	---	---	---	32 50
Weight, per set - - - - lbs.	40	44	49	100	---	---	---	---	132
Fisher's Mannington pattern, set	---	---	---	---	---	---	---	---	---
Weight, per set - - - - lbs.	---	---	---	---	---	---	---	---	---

Size - - - - - - - inches	5	5 3/16	5⅝	6	6¼	6⅝	7	7¼	7⅝
Scott's regular, fig. 2495 - set	$33 50	34 00	35 50	36 50	36 50	37 50	---	---	41 50
Weight, per set - - - - lbs.	185	185	200	208	208	210	---	---	234
Scott's Mannington pattern - set	$60 00	60 00	---	66 00	66 00	67 00	---	---	---
Weight, per set - - - - lbs.	388	388	---	410	410	380	---	---	---
Fair's regular, fig. 2499 - set	$33 50	34 00	35 50	36 50	36 50	37 50	41 50	41 50	---
Weight, per set - - - - lbs.	180	180	200	240	240	268	275	275	---
Fair's Mannington pattern - set	$60 00	60 00	---	66 00	66 00	67 00	---	---	---
Weight, per set - - - - lbs.	388	388	---	410	410	380	---	---	---
Fisher's regular, fig. 2503 - set	$33 50	34 00	35 50	36 50	36 50	37 50	---	---	41 50
Weight, per set - - - - lbs.	185	185	200	208	208	210	---	---	234
Fisher's Mannington pattern, set	$60 00	60 00	---	66 00	66 00	67 00	---	---	---
Weight, per set - - - - lbs.	388	388	---	410	410	380	---	---	---

Size - - - - - - - inches	8	8¼	8⅝	9⅝	10	10⅝	11⅝	12	14, o. d.
Scott's regular, fig. 2495 - set	$43 50	43 50	45 00	48 50	52 50	---	---	---	---
Weight, per set - - - - lbs.	256	256	256	363	386	---	---	---	---
Scott's Mannington pattern - set	$71 00	71 00	---	---	94 00	---	---	---	---
Weight, per set - - - - lbs.	536	536	---	---	570	---	---	---	---
Fair's regular, fig. 2499 - set	$43 50	43 50	45 00	48 50	52 50	57 00	58 00	98 00	122 00
Weight, per set - - - - lbs.	314	314	314	400	400	400	430	540	550
Fair's Mannington pattern - set	$71 00	71 00	---	---	---	---	---	---	---
Weight, per set - - - - lbs.	536	536	---	---	---	---	---	---	---
Fisher's regular, fig. 2503 - set	$43 50	43 50	45 00	48 50	52 50	---	---	---	---
Weight, per set - - - - lbs.	256	256	256	363	386	---	---	---	---
Fisher's Mannington pattern, set	$71 00	71 00	---	---	94 00	---	---	---	---
Weight, per set - - - - lbs.	536	536	---	---	570	---	---	---	---

ELEVATORS—HAND FORGED

Size - - - - - - - inches	2	2½	3	3½	4	5⅝	11⅝	12	14-o. d.
Scott's regular, fig. 2495 - set	---	340 00	42 00	43 50	46 50	---	---	---	---
Scott's Mannington pattern - set	$55 00	---	61 50	---	68 50	75 00	---	---	---
Fisher's regular, fig. 2503 - set	---	48 00	50 00	53 50	56 00	---	128 00	129 00	133 00
Fisher's Mannington, pattern, set	$64 00	---	79 00	---	94 00	102 00	---	---	---

Fig. 2502

ELEVATORS, WROUGHT IRON

FAIR'S PATENT IMPROVED

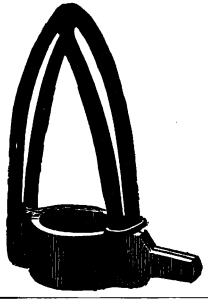
Sold in sets of two

Sizes - - - - inches	5	5 3/16	6	6 1/4	6 5/8	8	8 1/4
Per set - - - - - -	$71 00	71 00	77 00	77 00	----	82 00	82 00
Weight, per set, - lbs.	**388**	**388**	**410**	**410**	----	**536**	**536**

MALLEABLE IRON ELEVATORS

FAIR'S PATENT
Fig. 2510

FISHER'S PATENT
Fig. 2511



Per set of two

Sizes - - - - - - inches	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Fair's patent, fig. 2510, per set	$4 00	5 00	6 00	7 00	8 00	9 00	9 50
Weight, per set - - - - lbs.	**16**	**15**	**20**	**26**	**40**	**44**	**50**

Sizes - - - - - - inches	3 1/2	4	4 1/2	5	5 5/8	6 1/4	------
Fair's patent, fig. 2510, per set	$10 00	10 50	11 00	12 00	13 00	15 00	------
Weight, per set - - - - lbs.	**52**	**56**	**54**	**63**	**68**	**90**	------

Sizes - - - - - - inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Fisher's patent, fig. 2511, per set	$3 00	3 50	4 00	5 00	6 00	7 00	8 00
Weight, per set - - - - lbs.	------	**10**	**10**	**10**	**15**	**20**	**29**

Sizes - - - - - - inches	2 1/2	3	3 1/2	4	5	5 5/8	6 1/4
Fisher's patent, fig. 2511, per set	------	$9 50	------	10 50	------	13 00	15 00
Weight, per set - - - - lbs.	------	**35**	------	**46**	------	**60**	**80**

Fig. 2592

CASING OR TUBING SWIVEL

Sometimes used in place of elevators

Size - inches	2	3	3 1/4	3 1/2	4	4 1/4	4 1/2	5	5 5/8	6 1/4
Price - - - -	$7 75	8 75	8 75	9 75	10 50	10 50	11 00	12 75	13 50	14 50
Weight - lbs.	**7**	**16**	**14**	**18**	**24**	**22**	**28**	**34**	**32**	**46**

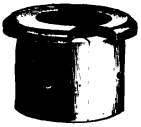
Size - inches	6 5/8	7 1/4	7 5/8	8 1/4	8 5/8	9 5/8	10	10 3/8	11 5/8	-----
Price - - - -	$15 00	15 50	15 50	16 75	20 00	23 00	26 50	28 50	33 00	-----
Weight - lbs.	**50**	**58**	**62**	**70**	**78**	**84**	-----	**90**	**100**	-----

ELEVATOR BUSHINGS

FOR FISHER ELEVATOR
Fig. 2509

Per set of 4 pieces

FOR FAIR OR SCOTT ELEVATOR
Fig. 2507

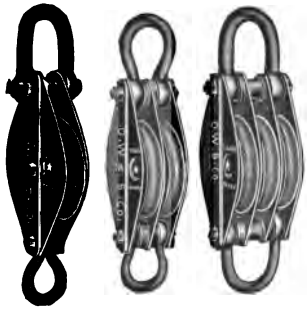


Size of elevators, inches	Size bushed to, inches	For Fisher elevators, per set	Wt., lbs.	For Fair & Scott elevators, per set	Wt., lbs.	Size of elevators, inches	Size bushed to, inches	For Fisher elevators, per set	Wt., lbs.	For Fair & Scott elevators, per set	Wt., lbs.
2	1½	$5 50	----	$6 25	----	7⅝	5⅝	$21 00	48	$23 00	----
3	2	7 30	----	8 50	----	7⅝	6¼	20 00	40	22 00	----
3	2½	9 00	----	9 75	----	7⅝	6⅝	20 00	42	22 00	----
4	3	11 25	----	12 75	----	8	6¼	26 25	66	27 75	----
5⅛	5	14 00	30	15 75	----	8	6⅝	26 25	62	27 75	----
5⅛	4½	17 00	----	18 75	----	8⅝	6⅝	26 25	68	27 75	----
5⅛	5 13/16	14 00	31	15 75	----	8⅝	7⅝	21 50	40	23 00	----
6¼	5	15 25	42	16 75	----	9⅝, 10	7⅝	35 00	120	38 25	----
6¼	5 13/16	15 25	38	16 75	----	9⅝, 10	8¼	33 00	90	34 50	----
6⅝	5	15 25	44	16 75	----	10⅝	8¼	36 50	110	39 50	----
6⅜	5 13/16	15 25	40	16 75	----	10⅝	8⅝	36 50	106	39 50	----
6⅝	5⅝	15 25	25	16 75	----	11⅝, 12	9⅝, 10	53 00	----	55 50	----
6⅝	6¼	15 25	20	16 75	----	13 O. D.	10	57 50	----	-----	----

ALL-IRON PULLEY BLOCKS

FOR MANILA OR WIRE LINE

Fig. 2515 Fig. 2517 Fig. 2519



Single Double Triple

PARTS

Inches	Upper single clevis	Lower single clevis	Upper double clevis	Lower double clevis	Upper triple clevis	Lower triple clevis
24	$11 50	9 00	14 00	12 50	-----	-----
26	12 50	11 50	14 00	12 50	-----	-----
28	15 75	12 50	15 50	14 00	17 50	16 00

ALL-IRON PULLEY BLOCKS, WITHOUT HOOKS

Size inches	SINGLE		DOUBLE		TRIPLE		QUADRUPLE		WEIGHT, LBS.			
	Regular bushed	Bronze bushed	Regular bushed	Bronze bushed	Regular bushed	Bronze bushed	Regular bushed	Bronze bushed	Single	Double	Triple	Quadruple
22	$32 00	38 00	55 00	68 00	66 00	87 00	------	------	109	200	310	----
24	35 00	41 00	59 00	72 00	73 00	94 00	------	----	163	240	350	----
26	40 00	46 00	65 00	78 00	84 00	104 00	116 00	140 00	185	280	385	475
28	45 00	51 00	74 00	87 00	90 00	111 00	143 00	167 00	245	353	464	580

All pulley blocks 22 inches and larger have self-lubricating sheaves.
When ordering, state whether for Manila or steel rope. The sheaves differ.

SHEAVES FOR PULLEY BLOCK

Fig. 2521 Fig. 2522

Fig. 2521—FOR MANILA ROPE.
Fig. 2522—FOR WIRE LINE

Size block for, inches	Diameter of sheave, inches	Weight, lbs.	Price
22	11½	35	$5 50
24	13½	48	7 25
26	14¾	52	7 50
28	16¾	72	8 00

SNATCH AND PULLEY BLOCKS WITH WOOD CASES

PRODUCER'S PATTERN

Fig. 2528

Single

Fig. 2530

Double

Fig. 2532

Triple

Size block, inches	Diameter sheave, inches	Weight of sheaves, lbs.	REGULAR BLOCKS, LESS HOOKS			IRON-BOUND BLOCKS, LESS HOOKS			HOOKS	
			Single, Fig. 2528, price	Double, Fig. 2530, price	Triple, Fig. 2532, price	Single, price	Double, price	Triple, price	Diameter, inches	Price
14	7¼	12	$8 00	-----	-----	9 50	-----	-----	1¾	$ 4 25
16	8	13	8 00	-----	-----	9 50	-----	-----	1¾	4 25
18	9	16	8 50	-----	-----	10 00	-----	-----	2	6 00
20	10	17	10 00	27 50	41 00	11 50	30 00	45 00	2⅜	10 00
22	11½	35	16 00	39 00	53 00	17 50	42 00	57 00	2⅝	12 00
24	13½	48	20 00	42 50	58 00	21 00	45 00	62 00	2¾	15 00
26	14¾	52	22 50	44 00	62 00	24 00	47 00	67 00	3	17 50
28	16¾	72	34 00	74 00	-----	36 00	77 00	-----	3½	30 00
30	---	--	51 00	98 00	-----	53 00	-----	-----	--	37 50

Extra for beckets - $3 00

WEIGHT OF BLOCKS AND HOOKS

Size - - - - - - inches	14	16	18	20	22	24	26	28	30
Single - - - - - - lbs.	42	46	48	56	86	122	140	170	200
Double - - - - - - lbs.	80	88	94	108	150	200	270	---	---
Triple - - - - - - lbs.	190	207	220	260	390	540	630	---	---
Hooks - - - - - - lbs.	21	21	27	55	64	80	95	130	---

PULLEY BLOCK PARTS

Size - - - - - inches	14	16	18	20	22	24	26	28	30
Steel pin and nut, single -	$1 00	1 00	1 25	1 25	2 50	2 75	3 00	3 50	3 75
Steel pin and nut, double -	----	----	----	2 00	3 00	3 25	3 50	4 00	----
Steel pin and nut, triple - -	----	----	----	----	3 50	4 00	4 25	4 50	----
Sheaves - - - - - - -	2 00	2 25	3 00	3 50	----	----	----	----	----
Sheaves, self-oiling - - -	----	----	----	----	5 50	7 25	7 50	8 00	8 50
Latch pins - - - - - -	50	50	75	75	1 00	1 00	1 00	1 00	----

Fig. 2535

The above steel pins and nuts from 22 to 28 inch inclusive are for either wood case or all iron snatch blocks.

ROUND IRON SNATCH AND PULLEY BLOCK HOOK—DOUBLE SWIVEL—Fig. 2535

Fig. 2537

Size iron, round - inches	3	3½	4	4½	5	5½	6
Weight - - lbs.	**90**	**140**	**170**	**220**	**255**	**340**	**440**
Price - - - - -	$17 50	30 00	37 50	50 00	55 00	70 00	125 00

TUBING HOOK—Fig. 2537

Size iron, round - - - - - - - - - inches	2	2¼	2⅜	2⅝	2¾
Weight - - - - - - - - - - - - lbs.	**20**	**30**	**40**	**50**	**60**
Price - - - - - - - - - - - - - -	$3 50	4 75	5 50	6 25	8 00

PATTERSON BLOCKS

Not illustrated.

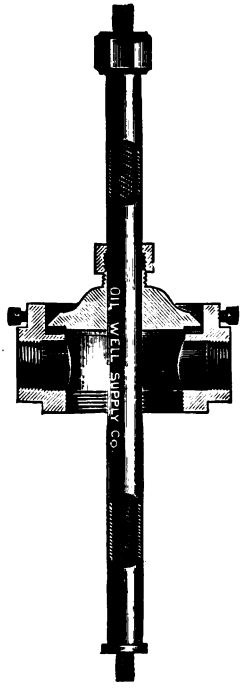
Size of Block, - - - - - - - - - - - - - - - - - - inches	PRICE OF BLOCKS ONLY		
	Single	Double	Triple
18 -	$15 00	34 00	39 00
20 -	-----	38 00	46 00
22 -	19 00	42 50	53 00
24 -	21 00	45 00	59 00
26 -	25 50	50 00	68 00
28 -	30 00	55 00	75 00
30 -	37 00	84 00	94 00

PATTERSON BLOCK PARTS

Size of block - - - - - - - - - inches		18	20	22	24	26	28	30
Shell - - - - - - - - -	single - -	$7 00	-----	9 00	10 75	12 50	14 00	15 50
	double - -	----	14 50	----	16 50	18 00	19 00	-----
	triple - -	----	18 00	----	21 00	23 00	24 00	-----
Sheave for Manila rope - -	single - -	2 00	-----	3 25	4 25	4 50	5 00	6 00
	double - -	----	3 25	----	4 50	5 00	6 00	-----
	triple - -	----	3 25	----	4 50	5 00	6 00	-----
Sheave for wire rope - - -	single - -	----	-----	3 60	4 75	5 00	6 00	6 50
	double - -	----	3 60	----	5 00	6 00	6 50	-----
	triple - -	----	3 60	----	5 00	6 00	6 50	-----
Shackle - - - - - - - -	double - -	----	5 50	----	6 50	7 50	8 00	-----
	triple - -	----	6 50	----	7 50	8 50	9 00	-----
Head bolt - - - - - - - -	double - -	----	80	----	1 00	1 15	1 15	-----
	triple - -	----	90	----	1 15	1 25	1 25	-----
Sheave pin and cotter - - -	single - -	60	-----	70	75	80	1 00	1 00
	double - -	----	90	----	1 00	1 10	1 10	-----
	triple - -	----	1 00	----	1 10	1 15	1 15	-----
Becket - - - - - - - - -	single - -	75	-----	80	90	1 00	1 25	1 25
	double - -	----	80	----	1 00	1 25	1 25	-----
	triple - -	----	80	----	1 00	1 25	1 25	-----
Pin and chain - - - - - -	single - -	80	-----	90	95	1 00	1 10	1 10

PATENT BARREL OIL SAVER AND PARTS

Fig. 2587



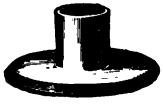
For drilling in the oil sand while the well is flowing. The drilling cable is put through the tube and packed with rope yarn. The tube works up and down with the cable through the cap in the casing head. The oil is carried off through the pipes in the sides of the casing head. The cap is fastened to the head by the set screws.

Size casing head for - - inches	5⅝, 6¼	5⅝, 6¼	5⅝, 6¼	6⅝, 7⅝	6⅝, 7⅝
Size of barrel - - - - inches	2½	2¾	3	2½	2¾
Weight - - - - - - - lbs.	**48**	**49**	**55**	**53**	**49**
Complete - - - - - - - - -	$16 50	23 00	24 00	17 00	29 00
Base, complete - - - - - - -	8 00	10 00	10 50	8 75	13 25
Base only - - - - - - - - -	3 75	4 50	4 50	5 00	8 50
Barrel and ring - - - - - - -	11 00	16 00	16 50	11 00	16 00
Stuffing box - - - - - - - -	2 50	2 75	3 00	2 50	4 00
Follower - - - - - - - - -	1 10	1 15	1 30	1 25	1 50
Top nut - - - - - - - - -	1 25	1 50	2 00	1 25	1 50

Size casing head for - - inches	6⅝, 7⅝	8¼	8¼	8¼	....
Size of barrel - - - - inches	3	2½	2¾	3	....
Weight - - - - - - - lbs.	**55**	**53**	**49**	**55**	....
Complete - - - - - - - - -	$30 00	21 50	30 50	31 00	....
Base, complete - - - - - - -	13 75	10 50	14 00	14 50	....
Base only - - - - - - - - -	9 00	7 00	9 00	10 00	....
Barrel and ring - - - - - - -	16 50	11 00	16 00	16 50	....
Stuffing box - - - - - - - -	4 50	3 00	5 00	5 50	....
Follower - - - - - - - - -	2 00	1 25	1 50	2 00	....
Top nut - - - - - - - - -	2 00	1 25	1 50	2 00	..

SAND LINE CAP

Fig. 2585



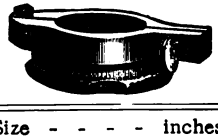
FOR MANILA OR WIRE ROPE

Fastened in the casing head. The sand pump line is put through it. Used while the well is flowing.

Size casing head for - - - - inches	5⅝	6¼	6⅝	7⅝	8¼
Price - - - - - - - - - - - -	$1 25	1 35	1 35	1 50	1 75
Weight - - - - - - - - - lbs.	**14**	**15**	**16**	**18**	**20**

NORTHRUP OIL SAVER

Fig. 2579



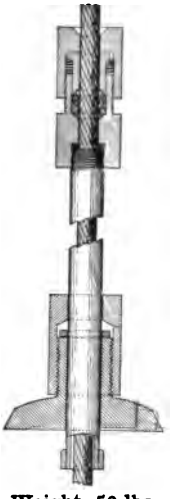
To save the oil when drilling in the oil sand and the well is flowing, or while tubing the well when it is flowing. The rubber disc encircles the cable or tubing tightly, and the oil runs through the pipes in the sides of the casing head, and is conducted to the oil tank.

Size - - - - inches	4¼	4½	5	5 3/16	5⅝	6-P	6¼	6⅝	7¼	7⅝	8¼
Weight - - - - lbs.	---	---	---	---	-	---	**25**	- -	---	---	**42**
Oil saver only - - -	$10 00	10 00	10 00	10 00	10 00	13 50	13 50	14 50	15 50	15 50	17 00
Extra rubbers - per set	2 00	2 00	2 00	2 00	2 00	2 50	2 50	2 75	3 25	3 25	4 00
Thumb bolt - - - -	50	50	50	50	50	70	70	70	---	---	---

OIL SAVERS

FOR WIRE LINE

CAIRO PATTERN
Fig. 2588



Weight, 50 lbs.

RIGBY'S PATENT
Fig. 2589

Weight, 30 lbs.

Cairo Pattern, Fig. 2588 - - - - - - - - - -	each	$15 00
Rigby's Patent, Fig. 2589, for ¾" wire line -	"	15 00

CASING DISC

Fig. 2570

To be attached to the lowest joint of casing and when the casing is lowered in well the water will buoy it up, sustaining a portion of the weight and saving much strain on the screw threads of the couplings. When the casing is in place the disc is broken by dropping a weight in the casing.

Size - - - - - inches	3¼	4¼	5	5⅝	6¼	7⅝	8¼
Price - - - - - - - -	$0 80	1 00	1 20	1 20	1 35	1 50	2 00

CASING TESTER WITH IRON TOP

Fig. 2596

Put below the casing and left a few hours, to test if the casing is tight and that no water leaks through.

Size - - - - - inches	4¼	5	5 3/16	5⅝	6¼	7⅝	8¼	8⅝
Price - - - - - - - -	$2 00	2 00	2 00	2 00	2 50	3 00	3 00	3 50

TUBING DISC

Fig. 2629

To prevent well flowing while being tubed. The check is put in the tubing above the perforated pipe, see fig. 1362, page 53. When the operation of tubing is complete, the disc, which is of brittle metal, is broken by dropping a weight in the tubing.

Size tubing - - - - - - - - - - - - - - - - inches	2	2½	3
Neath's patent - - - - - - - - - - - - - - - - - -	$2 00	4 50	6 75
Extra discs - - - - - - - - - - - - - - - - - - -	25	50	1 00
Couplings -	1 25	3 25	4 75
Nipples -	1 25	2 00	2 75

TUBING CATCHER

To prevent tubing from dropping while being placed in or removed from well.

Fig. 2633

Size - - - - - - inches	2	2	3	3
Number of dogs - - - - -	1	2	1	2
Weight - - - - - - lbs.	**50**	**60**	----	----
Price - - - - - - - - -	$7 00	9 00	8 00	9 00
Dog and bolts - - - each	3 50	----	----	----
Handles - - - - - - each	1 00	1 00	1 25	1 25

TUBING RING WITH WEDGES

To suspend tubing from casing head at any desired point without aid of coupling.

Fig. 1900

Size tubing - - - - - - - - - - inches	2	2½	3
Price - - - - - - - - - - - - - - - - - -	$18 00	22 00	26 00
Weight - - - - - - - - - - - - lbs.	**32**	-----	-----

TUBING BAILER ATTACHMENT

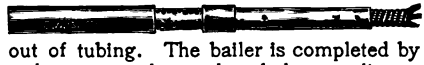


Fig. 2631

To bail water out of tubing. The bailer is completed by inserting one or more joints of 1-inch pipe between the rope socket end and the coupling. Valve ports open when bailer strikes the bottom, allowing fluid to enter, and close when it is suspended.

Size - inches	2	2½	3
Price -	$5 00	7 50	10 00
Brass valve for - - - - - - - - - - - - - - - - - -	1 00	2 50	5 00

DRIVE PIPE SHOES

Fig. 2488

To screw

Fig. 2490

To shrink

Size - - inches	1¼	1½	2	2½	3	3½	4	4¼	4½	4¾	5	5⅛	5⅝	6, 6¼
To screw - - -	$4 50	4 50	4 75	5 00	5 00	5 50	6 00	6 50	6 75	7 00	7 00	7 00	7 50	8 00
Weight - - lbs.	1.5	1.8	2.5	4	6	6.5	8	8	10	----	10	----	16	15
To shrink - - -	$5 00	5 00	5 25	5 50	5 50	6 00	6 50	7 00	7 00	----	7 50	----	8 50	9 00
Weight - - lbs.	----	----	----	- -	----	....	----	----	16	----	----	----	----	25

Size - - inches	6⅝	7	7¼	7⅝	8	8⅝	9	9⅝	10	10⅝	12	12½	14 O. D.	15 O. D.
To screw - - -	$8 50	11 00	11 00	11 00	11 00	25 00	25 00	25 00	25 00	33 00	40 00	45 00	60 00	70 00
Weight - - lbs.	17	25	25	29	35	34	50	55	71	----	90	----	95	100
To shrink - - -	10 00	13 00	13 00	13 00	13 00	27 00	27 00	27 00	27 00	35 00	42 00	47 00	65 00	75 00
Weight - - lbs.	28	35	----	----	51	....	70	----	97	----	120	----	----	----

For the California pattern drive shoes, use above list.

DRIVE PIPE HEADS

Fig. 2480

Hollow male

Fig. 2482

Hollow female

Fig. 2484

Solid

Size - - - - - inches	3	3½	4	4½	5	5⅝	6	8	9	10	12	14 O. D.	15 O. D.
Hollow, figs. 2480, 2482 -	$7 25	----	9 50	11 25	13 00	14 00	15 00	24 25	----	25 50	35 00	55 00	65 00
Weight - - - - lbs.	13	----	20	27	----	37	46	64	72	97	100	148	----
Hollow, extra heavy - -	----	----	----	----	----	----	20 00	----	---	----	...	----	....
Weight - - - - lbs.	----	----	----	....	----	----	133	----	----	----	----	----	----
Solid, fig. 2484 - - -	$4 00	4 25	4 50	4 75	9 50	10 00	10 50	23 50	32 50	33 00	35 50	43 00	----
Weight - - - - lbs.	----	----	----	----	----	78	81	204	----	205	----	----	----

MALLEABLE-IRON DRIVE CAP

Fig. 2486

Size - - - inches	1	1¼	1½	2	2½	3	3½	4
Each - - - - - -	$0 26	35	42	60	1 10	2 00	2 70	3 80
Weight - - - lbs.	----	----	----	----	----	----	----	----

DRIVE CLAMPS AND WRENCH

Fig. 1920

Fig. 1922

Size drive pipe, inches	Size square on stem, inches	Size of iron, inches	Size of bolts, inches	Weight, lbs.	Clamps only, Fig. 1920
5	3¼	4 x 4 x 10½	2 x 13	115	$23 00
5⅝ & 6	3¼	4 x 4 x 11½	2 x 13	124	23 75
	3¼	4 x 4 x 12	2 x 13	129	25 50
	3¼	4¼ x 4¼ x 14	2¼ x 14	166	28 00
8	3½	4¼ x 4¼ x 14	2¼ x 14	166	28 00
	4 & 4¼	4½ x 4½ x 14	2¼ x 15	183	29 50
	4½	5 x 5 x 14	2¼ x 15	218	32 00
	3¼	4 x 4 x 16	2 x 13	163	27 50
	3¼	4¼ x 4¼ x 16	2¼ x 14	187	29 25
10	3½	4¼ x 4¼ x 16	2¼ x 14	187	29 25
	4 & 4¼	4½ x 4½ x 16	2¼ x 15	205	30 75
	4½	5 x 5 x 16	2¼ x 15	246	33 75
	3¼	4¼ x 4¼ x 18	2¼ x 14	206	31 50
12	3½	4¼ x 4¼ x 18	2¼ x 14	206	31 50
	4 & 4¼	4½ x 4½ x 18	2¼ x 15	228	32 00
	4½	5 x 5 x 18	2¼ x 15	274	35 25
	3¼ & 3½	4¼ x 4¼ x 20	2¼ x 14	226	32 50
14	4 & 4¼	4½ x 4½ x 20	2¼ x 15	250	33 25
	4½	5 x 5 x 20	2¼ x 15	301	37 00
16	4½ & 5	5 x 5 x 22	2¼ x 17	358	58 00
18	4½ & 5	5 x 5 x 24	2¼ x 17	375	60 00

Bolts and nuts - - - - - - - - size	2 x 13	2¼ x 14	2¼ x 14½	2¼ x 15	2¼ x 17
Weight - - - - - - - - - - lbs.	**23**	**27**	**27.5**	**28**	**37**
Price - - - - - - - - - - - -	$5 75	6 00	6 25	6 50	8 00

Wrenches, fig. 1922—**weight, 20 lbs.** - - - - - - - - - - - - - - - - - - $2 75

O. K. SPUDDING SHOE

Fig. 1543

Weight, 27 pounds

GILLESPIE SPUDDING SHOE

Fig. 1544

Weight, 18 pounds

O. K. spudding shoe, fig. 1543, complete with spudding arm, fig. 1545 - - - - - - $5 00
Gillespie spudding shoe, fig. 1544, complete with spudding arm, fig. 1545 - - - - - 5 00

WRIST PIN SPUDDING ARM

Fig. 1545

Weight, 25 pounds

By using the wrist pin spudding arm in connection with fig. 1543 or fig. 1544 the wear on the spudding ropes is decreased.

Wrist pin spudding arm, fig. 1545 - $2 00
Spudding ring, not illustrated - 1 00

NEELY PATENT SPUDDING SHOE

Not illustrated

Weight, 28 pounds

Shoe complete - - - - - - - - - $5 00
Clevis only - - - - - - - - - - 75
Shoe only - - - - - - - - - - $3 50
Spool only - - - - - - - - - - 1 00

Fig. 2627

MASSETH TUBING SUPPORTER

Fig. 2625

Not in common use.

Designed for wells of extreme depth, 3,000 feet or more.

Fig. 2627 is attached to the tubing midway, and rests in the top of fig. 2625.

Fig. 2625 is put in the well midway between top and bottom to take part of the weight of the tubing off the casing head when suspended for pumping.

CASING OR TUBING CLAMP

Fig. 2921

ANCHOR CLAMP

Anchor Clamp, Fig. 2919, is to fasten tubing to derrick sills; to hold down tubing or casing when well is packed with gas packer. Complete with two 1 x 36-inch anchor rods.

MADE OF 1 x 4 INCH IRON

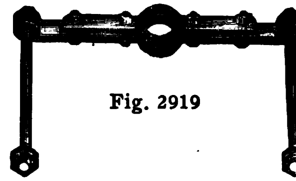
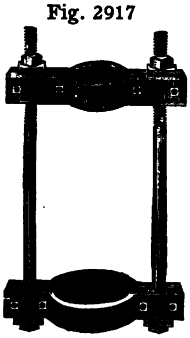


Fig. 2919

Size tubing or casing - inches	2	2½	3	3½	4	4½	5	5⅝
Fig. 2921 - - - - - - - price	$5 50	5 75	6 00	6 25	6 50	6 50	6 75	7 25
Weight - - - - - - - - lbs.	**60**	**60**	**60**	**62**	**62**	**62**	**63**	**64**
Fig. 2919 - - - - - - - price	$11 50	11 50	11 50	11 75	11 75	11 75	12 00	12 50
Weight - - - - - - - - lbs.	**105**	**105**	**105**	**106**	**106**	**106**	**108**	**110**
Size tubing or casing - inches	6¼	6⅝	7⅝	8¼	9⅝	- - -	11⅝	- - -
Fig. 2921 - - - - - - - price	$7 75	8 00	9 00	9 50	10 50	- - -	12 00	- - -
Weight - - - - - - - - lbs.	**66**	**67**	**70**	**72**	**74**	- - -	**76**	- - -
Fig. 2919 - - - - - - - price	$13 00	14 00	15 00	16 00	18 00	- - -	21 00	- - -
Weight - - - - - - - - lbs.	**112**	**112**	**114**	**116**	**118**	- - -	**120**	- - -

Fig. 2917



ANCHOR CLAMP

TO ANCHOR TUBING TO DRIVE PIPE OR CASING

To hold tubing in wells where gas pressure exceeds weight of tubing.

MADE OF 1 x 4 INCH IRON—WITH 1 x 36 INCH BOLTS

Size tubing for - in.	2	2	2	2	2	2	2
Size drive pipe or casing for	4½	5	5⅝	6¼	6⅝	8	8¼
Price - - - - -	$17 00	17 25	17 50	18 00	18 50	19 00	19 00
Weight - - lbs.	**200**	**201**	**202**	**204**	**205**	**208**	**210**
Size tubing for - in.	3	3	3	3	4	4	- - -
Size drive pipe or casing for	6¼	6⅝	8¼	10	6⅝	10	- - -
Price - - - - -	$18 25	18 75	19 50	24 00	19 00	25 00	- - -
Weight - - - lbs.	**210**	**212**	**214**	**216**	**214**	**220**	- - -

ANCHOR BOLTS

Size - - - - - inches	¾ x 36	⅞ x 36	1 x 36	¾ x 40	⅞ x 40	1 x 40
Straight - - - - each	$0 55	.70	.85	.60	.75	.90
Weight - - - - - lbs.	**5**	**7**	**9**	**6**	**7½**	**10**
With hook on one end, each	- - -	- - -	- - -	$1 00	1 10	1 25

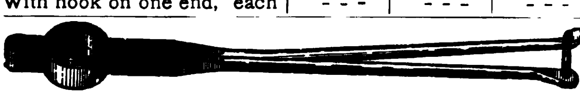


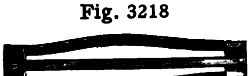
Fig. 3216

CASING AND TUBING CLAMP

Fig. 3216 - - - size, inches	½	¾	1	2	3¼	5⅝
Each - - - -	$2 00	2 25	2 50	3 25	4 00	6 50

ARNOLD'S TUBING STAY

Fig. 3218



Size - - - - inches	¾ x 5⅝	1¼ x 5⅝	2 x 5⅝	3 x 5⅝
Each - - - - - - - -	$1 75	1 85	2 10	2 25

WATER WELL HOOK

Not illustrated

Price - $3 50

COMMON CASING HEADS

TWO-WAY
Fig. 2542

One-hole top

TWO-WAY
Fig. 2547

Two-hole top

FOUR-WAY
Fig. 2545

One-hole top

TWO-WAY
Fig. 2557

With side outlet for 2½ or 3 inch tubing

Size - - - - - - - inches	3¼	4¼	4½	5	5 3/16
Two-way with 1-hole top - - -	$2 50	2 50	2 50	3 00	3 00
Two-way with 2-hole top - - -	3 00	3 00	3 00	3 50	3 50
Weight - - - - - - - lbs.	**36**	**36**	**36**	**40**	**40**
Four-way with 1-hole top - -	-----	----	----	$4 25	4 25
Four-way with 2-hole top - -	-----	----	----	4 75	4 75
Weight - - - - - - - lbs.	-----	----	----	**44**	**44**
Two-way, fig. 2557 - - - - -	-----	----	----	$10 00	10 00
Weight - - - - - - - lbs.	-----	----	----	**66**	**66**

Size - - - - - - - inches	5⅝	6 pipe	6¼	6⅝	7⅝	8¼	8⅝	9⅝	10	10⅝	11⅝	12
Two-way with 1-hole top - -	$3 00	3 40	3 40	4 25	6 00	9 50	13 00	19 00	21 00	22 50	25 00	27 00
Two-way with 2-hole top - -	3 50	3 90	3 90	4 75	6 50	10 00	13 50	19 75	22 00	23 25	25 75	28 00
Weight - - - - - - - lbs.	**40**	**44**	**44**	**44**	**59**	**92**	**93**	**99**	----	**101**	**129**	----
Four-way with 1-hole top - -	4 25	5 00	5 00	6 00	8 00	12 00	17 00	24 00	26 00	27 50	30 00	33 00
Four-way with 2-hole top - -	4 75	5 50	5 50	6 50	8 50	12 50	----	----	----	----	----	----
Weight - - - - - - - lbs.	**44**	**47**	**47**	**47**	**67**	**95**	----	----	----	----	----	----
Two-way, fig. 2557 - - - -	10 00	11 50	11 50	13 00	15 00	18 00	----	----	----	----	----	----
Weight - - - - - - - lbs.	**66**	**99**	**99**	**99**	**100**	**101**	----	----	----	----	----	----

CHICKERING CASING HEAD
Fig. 2561

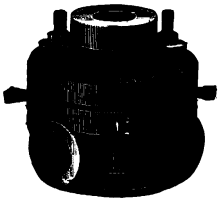
BERRY CASING HEAD
Fig. 2563

COMMON TEE CASING HEAD
Fig. 2573

Size - - - - - - - inches	4¼	4½	5	5 3/16	5⅝	6 p	6¼	6⅝	7¼	7⅝	8¼
Two-way, fig. 2561 or 2563 with 4 set screws - - - -	$6 00	6 00	6 00	6 00	5 50	8 00	8 00	9 00	9 50	9 50	12 50
Weight - - - - - - - lbs.	**44**	**44**	**46**	**46**	**46**	**54**	**54**	**70**	**74**	**78**	**97**
Four-way with 4 set screws -	$7 00	7 00	7 00	7 00	7 00	9 00	9 00	10 00	10 50	10 50	13 50
Weight - - - - - - - lbs.	**48**	**48**	**48**	**50**	**50**	**59**	**59**	**76**	**79**	**84**	**101**
Common tee, fig. 2573 - - -	-----	----	$5 25	5 25	5 25	7 00	7 00	9 00	-----	12 00	16 00
Weight - - - - - - - lbs.	-----	----	**66**	**66**	**66**	**78**	**78**	**84**	-----	-----	-----

ARMOR CASING HEAD TOP

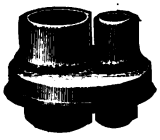
Fig. 2559



Size casing head for - inches	5⅝	6¼	5⅝	6¼
Size tubing for - - inches	2	2	3	3
Tops, complete - - - - -	$7 00	7 00	10 00	10 00
Tops, complete less rubber -	4 00	4 00	6 00	6 00
Rings only - - - - - -	50	50	75	75
Covers only - - - - - -	1 50	1 50	2 00	2 00
Rubbers only - - - - - -	3 00	3 00	4 00	4 00
Center flanges - - - - -	1 00	1 00	1 50	1 50
Bases - - - - - - - - -	1 50	1 50	2 00	2 00
Studs - - - - - - - - -	30	30	30	30

AJAX CASING HEAD TOPS

Fig. 2553



For tubing and steam pipe

Derricks are often blown down, causing the tubing to break off and drop in the hole. This has been a source of great annoyance and expense, and can be avoided by the use of our safety casing head tops. They are so made that the tubing will break off above the coupling.

Fig. 2555

For tubing only

	TOPS				RINGS				
Size - - - - - inches	5⅝ 1-hole	5⅝ 2-hole	6¼ 1-hole	6¼ 2-hole	2 1-hole	2 2-hole	1½ 2-hole	1 2-hole	¾ 2-hole
Weight - - - - - lbs.	**13**	**13**	**16**	**16**	**12**	**12**	**12**	**5**	**5**
Price - - - - - - - -	$2 50	2 75	3 00	3 25	1 25	1 25	1 25	75	75

CASING HEAD TOPS AND RINGS

Not illustrated

Size head for - - inches	2¾	3¼, 4¼, 5, 5⅝	6¼	6⅝	7⅝	8, 8¼, 8⅝	9⅝	10⅝	11⅝
Tops, regular - - - - -	$0 75	75	1 00	1 25	1 50	2 00	2 50	3 00	3 50
With two and one inch hole	1 00	1 00	1 25	1 50	1 75	2 25	3 00	3 50	4 00
Rings, regular two-inch -	30	30	30	30	30	30	30	30	30
Weight - - - - - lbs.	**3**	**9**	**11**	**11**	**11**	**16-24**	**24**	**27**	**42**

Rings, size - - - - - - - - - - - - - - - inches	1¼	2½	3 and 4
Price -	$0 30	40	50

Tops, size tubing -	2½, 3 or 4 inch		
Tops, size casing head - - - - - - - - - - - - - - - - - -	5, 5⅝	6¼	6⅝
Price -	$0 75	1 00	1 25

RINGS FOR TWO-HOLE TOPS

Rings, size - - - - - - - - - inches	¾ and 1 inch	2-inch
Price - - - - - - - - - - - - - -	$0 25	30

THE HAYES PATENT CASING HEAD

WITH TUBULAR EXTENSION

Fig. 2580

Fig. 2580A

Is attached by sliding the extension tube into the Casing; no special threaded nipple is required. "Bell over" the top of Casing with hammer, wrap a little hemp packing around the tubular extension of Casing Head, slide into casing and the curved shoulder of Casing Head will rest on the "belled over" top and make a tight and satisfactory joint.

PRICE

Size inches	With Regular Top	With Ajax Safety Top
5	$3 25	$3 75
5⅝	3 25	3 75
6¼	4 00	4 50

Weights: 5", 41 lbs.; 5⅝ and 6¼", 43 lbs.

THE KIRSCHNER TUBING TOP

PATENTED JUNE 9, 1903

Fig. 2581

Length, 4 feet.

The Kirschner Tubing Top is solid wrought metal. There is no thread or joint where the upper end rests on the casing head.

Constant vibration from pumping weakens the ordinary coupling joint at the casing head. Fires expand the coupling and wind storms blow down derricks; from these and other causes tubing is frequently dropped in the well.

The Kirschner Tubing Top is designed to prevent such losses.

Regular weight, 2-inch	each	$7 00
Heavy, for deep wells, 2-inch	each	7 50

WROUGHT IRON CASING HEAD TOPS

Size casing head for, inches	$5\frac{3}{16}$	$5\frac{5}{8}$	$6\frac{1}{4}$	$6\frac{5}{8}$	$7\frac{5}{8}$	$8\frac{1}{4}$	$8\frac{5}{8}$	9	$9\frac{5}{8}$
Price- - - - - - - -	$2 00	2 00	2 25	2 25	2 35	2 50	2 50	2 75	2 75

WROUGHT IRON CASING HEAD RINGS

Size tubing or casing for - - - inches	2	$2\frac{1}{2}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Price - - - - - - - - - - - - -	$1 00	1 00	1 15	1 15	1 25	1 25	1 50

CASING HEAD SET SCREWS

Size casing head for, inches	5	$5\frac{3}{16}$	$5\frac{5}{8}$	6 p	$6\frac{1}{4}$	$6\frac{5}{8}$	$7\frac{1}{4}$	$7\frac{5}{8}$	$8\frac{1}{4}$
Price - - - - - - - -	$0 15	15	15	15	15	15	15	15	15

WOLF'S SAFETY CASING CAP

Fig. 2565

For $5\frac{5}{8}$-inch casing - price, $2 50
For $6\frac{1}{2}$-inch casing - price, 2 50

STUFFING BOX CASING HEADS

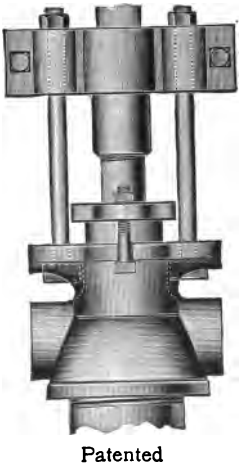
Fig. 2575

Fig. 2574 can be used with anchor as shown in illustration; or without when gas pressure is not sufficient to raise tubing.

Sizes for - - - - -	5 in. casing	$5\frac{5}{8}$ in. casing	$6\frac{1}{4}$-in. casing
Fig. 2575 - - - - -	$20 00	22 50	25 00
Weight - - - lbs.	**98**	**98**	**160**
Fig. 2574 - - - - -	------	$15 00	16 00
Weight - - - lbs.	------	------	------

Sizes for - - - - -	$6\frac{5}{8}$-in. casing	$8\frac{1}{4}$-in. casing	10-in. pipe
Fig. 2575 - - - - -	$27 50	30 00	32 50
Weight - - - lbs.	**160**	**198**	**245**
Fig. 2574 - - - - -	------	------	------
Weight - - - lbs.	------	------	------

Fig. 2574

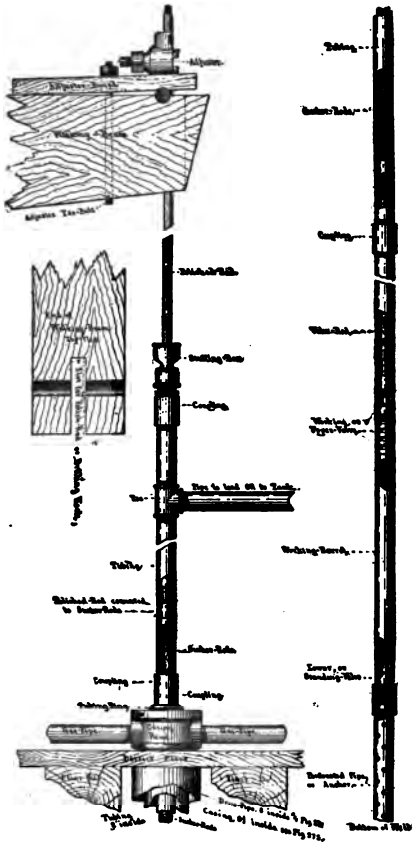


Patented

PUMPING OUTFITS

SHOWING EVERYTHING USED IN PUMPING AN OIL WELL, AND HOW THE PARTS ARE CONNECTED

Fig. 1375



A regular pumping outfit consists of the following:

Adjuster.	Set of valves.
Adjuster board.	Stuffing box.
Adjuster T bolt.	Working barrel.
Polished rod.	Three feet perforated pipe.
Substitute.	Valve rod.

For prices see under various headings.

ADJUSTER—LITTLE GIANT

Fig. 2640

Malleable iron—weight, 9 lbs. - - - - - $3 00
Cast iron—weight, 15 lbs. - - - - - - 3 00

LEWIS OR LOCKE ADJUSTER

LEWIS
Fig. 2642

LOCKE
Fig. 2644

Adjuster for 1⅛ polished rod - - - - - - $6 00
Adjuster for 1¼ polished rod - - - - - - 6 00
Adjuster for 1½ polished rod - - - - - - 10 50
Extra plug for Lewis or Locke - - - - - 2 50
Castings for Lewis or Locke - - - - - - 4 50

Weight, each, 30 pounds.

BOLTED ADJUSTER

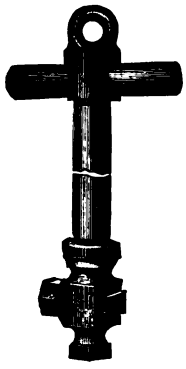
Fig. 2646

Size polished rod - - - - - - - - - inches	⅞	1⅛	1¼	1½
Price - - - - - - - - - - - - - - - - -	$3 00	10 00	10 00	12 00

Weight, 13 pounds.

GRIP ADJUSTERS AND PARTS

SINGLE
Fig. 2648



Weight, 34 lbs.

DOUBLE
Fig. 2650

Weight, 52 lbs.

WRENCH
Fig. 2651

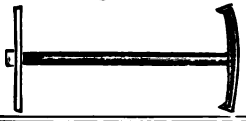
Weight, 10 lbs.

For size of polished rod - inches,	1⅛ and 1¼
Single, complete, fig. 2648 -	$6 00
Double, complete, fig. 2650 -	7 00
Crosshead, only -	2 00
Single lower part, complete -	3 50
Double lower part, complete -	4 00
Plug and nut -	1 50
Wrench -	2 50
Malleable swivel -	1 00
Collar -	35
Lock nut -	25
Grip pipes, 2 inch x 8 foot; **weight, 29 lbs.** - - - - - - - - - - - - - - - - - -	3 00
Grip pipes, 2 inch x 8 foot; **extra heavy, weight, 40 lbs.** - - - - - - - - - - - -	5 00

ADJUSTER BOARD
Fig. 2659

Weight - - - - - 12 lbs.
Price - - - - - - $0 40

ADJUSTER T BOLT
Fig. 2663



Size of bolt - inches	⅞	1	1⅛	1¼
Weight - - **lbs.**	5	7	9	12
Price - - - - - -	$1 00	1 50	2 00	2 50
Extra washers -	15	20	25	40

Fig. 2671

ELEVATOR SUBSTITUTE

Size of rod for - - inches	1⅝	1⅞	2¼	2½	3½
Size of box - - - inches	⅞	1	1⅛	1¼	1½
Price - - - - - - - - -	$0 60	75	1 40	1 50	2 75

Fig. 2657

POLISHED ROD

Diameter, inches	Length, feet	Size pin, inches	Size box, inches	Size sucker rod for, inches	Weight, lbs.	Price
5/8	11	5/8	5/8	1/2 iron	12	$3 30
3/4	11	3/4	3/4	1 5/8 wood	17	3 60
1	11	1	1	1 3/8 wood	30	4 00
1 1/8	6	7/8	7/8	1 3/8 wood	22	3 60
1 1/8	8	7/8	7/8	1 5/8 wood	28	4 10
1 1/8	5	with eye	7/8	1 3/8 wood	18	5 25
1 1/8	5	with swivel	7/8	1 5/8 wood	19	5 75
1 1/8	11	7/8	7/8	1 3/8 wood	37	5 10
1 1/8	11	7/8	1	1 7/8 wood	37	5 20
1 1/8	11	1	1	1 7/8 wood	37	5 20
1 1/8	16	1 1/8	1 1/8	2 1/4 wood	55	8 00
1 1/8	15	7/8	7/8	1 5/8 wood	51	6 80
1 1/8	10	1 1/8	1 1/8	2 1/4 wood	34	6 50
1 1/8	16	7/8	7/8	1 5/8 wood	55	7 40
1 1/8	11	1 1/8	1 1/8	2 1/4 wood	38	6 70
1 1/4	11	7/8	7/8	1 5/8 wood	46	6 60
1 1/4	11	1	1	1 7/8 wood	46	6 85
1 1/4	11	1 1/8	1 1/8	2 1/4 wood	47	7 85
1 1/4	11	1 1/4	1 1/4	2 1/4 wood	47	7 90
1 1/4	8	7/8	7/8	1 5/8 wood	34	5 00
1 1/2	16	1 1/2	1 1/2	3 1/2 wood	97	14 00
1 1/2	11	1 1/2	1 1/2	3 1/2 wood	67	12 00

For 1 1/8-inch brass casing polished rods, add to above list - - - - - - - - $4 00
For 1 1/4-inch brass casing polished rods, add to above list - - - - - - - - 5 00
For 1 1/8-inch brass casing polished rods with 2-inch stuffing box, add to above list - 6 00
For 1 1/4-inch brass casing polished rods with 2-inch stuffing box, add to above list - 7 00
Eyes for 1 1/8-inch polished rods - 1 40
7/8-inch polished rod boxes - 40

VALVE ROD

Fig. 2661

To connect the lower end of the sucker rods to the working valve

Size valves for, inches	Size of box, inches	Size of pin, inches	Size rods for, inches	Weight, lbs.	Price
1 3/8	3/8	7/8	7/8 iron	----	$1 00
1 3/4	1/2	7/8	1 5/8 wood	7	1 00
1 3/4	1/2	1	1 7/8 wood	----	1 25
2 1/4, 2 3/4	3/4	7/8	1 5/8 wood	9.5	1 50
2 1/4, 2 3/4	3/4	1	1 7/8 wood	9.5	1 75
2 1/4, 2 3/4	3/4	1 1/8	2 1/4 wood	13.5	2 50
2 1/4, 2 3/4	3/4	1 1/4	2 1/4 heavy	13.5	3 00
3 1/4	1	7/8	1 5/8	17	1 50
3 1/4	1	1	1 7/8	17	1 85
3 1/4	1	1 1/8	2 1/4	17	3 00

Size valves for, inches	Size of box, inches	Size of pin, inches	Size rods for, inches	Weight, lbs.	Price
3 1/4	1	1 1/4	2 1/4 heavy	17	$3 25
3 1/4	1 1/4	1	2 1/4 heavy	17	3 25
3 3/4	1 1/4	1 1/8	2 1/4	22	3 50
3 3/4	1 1/4	1 1/4	2 1/4 heavy	22	3 75
4 1/4, 4 3/4	1 1/4	1 1/8	2 1/4	22.5	3 50
4 1/4, 4 3/4	1 1/4	1 1/4	2 1/4 heavy	22.5	3 75
4 1/4, 4 3/4	1 1/4	1 1/2	3 1/2	25	6 00
5 1/4, 5 3/4	1 1/2	1 1/8	2 1/4	33	6 00
5 1/4, 5 3/4	1 1/2	1 1/4	2 1/4 heavy	34	6 00
5 1/4, 5 3/4	1 1/2	1 1/2	3 1/2	35	6 25

Fig. 2658

POLISHED ROD CLAMPS

Size - - - - - - - - - - - - - - - inches	1⅛	1¼
Price - - - - - - - - - - - - - - - - - -	$0 60	60
Weight - - - - - - - - - - - - - - - **lbs.**	**5**	**5.5**

Polished Rod Grip, "C"-Pattern - - - - - - - - - - - - each, $3 00

SUBSTITUTES

For connecting sucker rods, polished rods, valve rods, or valves of different sizes of threads

SUCKER-ROD SUBS

Not illustrated

BOX		PIN		Price	BOX		PIN		Price
Size, inches	Thread	Size, inches	Thread		Size, inches	Thread	Size, inches	Thread	
⅞	10	1	10	$0 40	1 5/16	10	⅞	10	$0 50
1	10	⅞	10	40	1	10	1 5/16	10	50
⅞	10	1⅛	10	40	1 5/16	10	1	10	50
1⅛	10	⅞	10	40	1	10	1⅛	8	50
1	10	1⅛	10	40	1⅛	8	1	10	50
1⅛	10	1	10	40	1⅛	8	1¼	8	60
⅞	10	1 5/16	10	50	1¼	8	1⅛	8	60

VALVE SUBS

Not illustrated

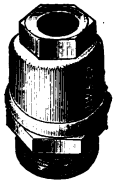
½-inch pipe box, 1⅛-inch, 10-thread pin - - - - - - - - - - - - - - - - - -	$0 15
¾-inch pipe box, 1⅛-inch, 10-thread pin - - - - - - - - - - - - - - - - - -	15
½-inch pipe box, 1 5/16-inch, 10-thread pin - - - - - - - - - - - - - - - - - -	25
¾-inch pipe box, 1 5/16-inch, 10-thread pin - - - - - - - - - - - - - - - - - -	25

Fig. 2665

With bowl

BRASS STUFFING BOXES

Fig. 2667



Without bowl

Size polished rod - inches	⅝	⅞	1⅛	1⅛	1⅛	1¼
Size tubing - - - - - -	1¼	2	2	2½	3	2
Weight - - - - - - **lbs.**	- - -	- - -	**5**	**7**	**10**	**5**
Complete - - - - - - -	$1 75	2 00	2 00	3 50	4 25	2 25
Upper parts - - - - - -	- - -	- - -	1 00	1 25	- - -	1 25
Lower parts - - - - - -	- - -	- - -	1 00	1 25	- - -	1 25
Followers - - - - - - -	- - -	- -	25	30	- - -	35

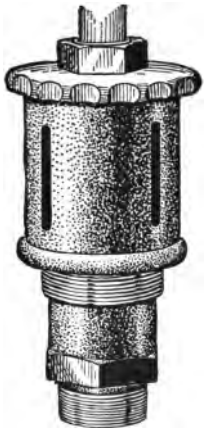
Size polished rod - inches	1¼	1¼	1½	1½	1½	1½
Size tubing - - - - - -	2½	3	3½	4	4	5 and 6
Weight - - - - - - **lbs.**	**7**	**10**	- - -	- - -	- - -	- - -
Complete - - - - - - -	$3 50	4 25	4 75	5 00	7 00	10 00
Upper parts - - - - - -	1 50	- - -	- - -	- - -	- - -	- - -
Lower parts - - - - - -	1 50	- - -	- - -	- - -	- - -	- - -
Followers - - - - - - -	40	- - -	- - -	- - -	- - -	- - -

Fig. 2669

IRON FLANGED STUFFING BOX

Size polished rod, inches	1 1/8	1 1/8	1 1/8	1 1/4	1 1/4	1 1/4
Size tubing - - inches	2	2 1/2	3	2	2 1/2	3
Weight - - - - lbs.	**11**	**12**	**13**	**11**	**12**	**13**
Complete - - - - - - -	$2 75	3 25	3 75	2 75	3 25	3 75
Upper part - - - - - -	1 25	1 50	1 75	1 25	1 50	1 75
Lower part - - - - - -	1 75	2 00	2 35	1 75	2 00	2 35

Fig. 2664



SUPERIOR STUFFING BOX

AUTOMATIC ADJUSTMENT

Patented

Size polished rod, inches	1 1/8	1 1/8	1 1/8	1 1/4	1 1/4	1 1/4
Size tubing - - inches	2	2 1/2	3	2	2 1/2	3
Weight - - - - lbs.	**13**	**16**	**18**	**13**	**16**	**18**
Complete - - - - - - -	$3 00	3 50	4 00	3 00	3 50	4 00
Upper part or bowl - -	2 00	2 25	2 50	2 00	2 25	2 50
Lower part or bowl - -	1 50	1 75	2 00	1 50	1 75	2 00
Follower - - - - - - -	60	60	60	60	60	60
Springs, 1/4 inch - - - -	30	----	----	----	----	----
Springs, 7/16 inch - - -	----	40	40	40	40	40

STEEL WORKING BARRELS

Size tubing for, in.	Inside diam., inches	Outside diam., inches	Gauge	Length tube, ft.	Length tube, in.	Length barrel, ft.	Length barrel, in.	Weight per ft., lbs.	Length stroke, inches	Capacity per stroke, gallons	Weight, lbs.	Price
1 1/4	1 1/16	1 3/8	--	4	6	4	8	2	42	.18	13 1/2	$8 00
1 1/4	1 1/8	1 3/8	--	5	0	5	2	2	48	.20	14 1/2	8 25
1 1/2	1 3/8	1 5/8	--	5	0	5	3	2.8	42	.27	11	8 50
2	1 1 3/16	--	9	5	2	5	6	3.3	39	.43	24	9 00
2	1 1 1/8	--	9	5	4	5	8	3.3	41	.45	25	9 25
2	1 1 3/16	--	9	5	6	5	10	3.3	43	.47	25	9 50
2	1 1 1/8	--	9	5	8	6	0	3.3	45	.50	26	9 75
2	1 1 3/16	--	9	5	10	6	2	3.3	47	.52	27	10 00
2	1 1 1/8	--	9	6	0	6	4	3.3	49	.59	29	10 25
2	1 1 3/16	--	9	7	0	7	4	3.3	60	.66	32	10 50
2	1 1 1/8	--	5	5	2	5	6	4.77	39	.43	30	10 50
2	1 1 3/16	--	5	5	4	5	8	4.77	41	.45	31	10 75
2	1 1 1/8	--	5	5	6	5	10	4.77	43	.47	32	10 75
2	1 1 3/16	--	5	5	8	6	0	4.77	45	.50	33	11 00
2	1 1 1/8	--	5	5	10	6	2	4.77	47	.52	34	11 25
2	1 1 3/16	--	5	6	0	6	4	4.77	49	.59	35	11 75
2	1 1 1/8	--	5	7	0	7	4	4.77	60	.66	38	13 00
2 1/2	2 1/16	2 3/8	--	5	0	5	4	3.8	39	.67	43	22 00
2 1/2	2 1/16	2 3/4	--	5	6	5	10	3.8	45	.77	45	24 00
2 1/2	2 1/16	2 3/4	--	6	0	6	4	3.8	50	.86	47	26 00
2 1/2	2 1/16	2 3/4	--	6	6	6	10	3.8	56	.96	49	28 00
2 1/2	2 1/16	2 3/4	--	7	0	7	4	3.8	62	1.06	51	30 00
3	2 3/16	3 1/4	--	5	0	5	4	8	39	1.00	56	25 00
3	2 3/16	3 1/4	--	5	6	5	10	8	45	1.15	60	26 50
3	2 3/16	3 1/4	--	6	0	6	4	8	50	1.28	64	28 00
3	2 3/16	3 1/4	--	6	6	6	10	8	56	1.43	68	29 50
3	2 3/16	3 1/4	--	7	0	7	4	8	62	1.59	72	31 00

CAST IRON WORKING BARREL

Size of tubing, inches	Inside diameter of barrels, inches	Weight, lbs.	Without valves
2	1½	46	$9 00
2	1¾	50	9 00
2½	2¼	64	18 00

LOWER COUPLING AND SEAT FOR WORKING BARREL

MALLEABLE IRON

Size - inches	1¾	2¼
Price - - -	$0 85	1 65

WORKING BARREL COUPLING AND SEAT

WROUGHT IRON

Size - - - - - - inches	2	2½	3	3½	4	4½	5	5⅝	6
Upper couplings - - - -	$0 50	1 25	2 50	2 75	3 50	5 25	6. 50	7 50	8 50
Lower seat - - - - - -	75	1 50	3 00	3 25	4 00	6 00	7 50	9 00	10 00

INSERTED WORKING BARRELS, PLUNGERS, ETC.

Inserted working barrels are used where the regular working barrel is worn out. They are lowered into the well with the sucker rods, and when properly seated in the barrel are ready for operation.

OIL WELL SUPPLY CO.'S
Fig. 2720

With brass tube, 1⅜ in. i. d. x 1⅝ in. o. d. x 3 ft. 6 in. - - - - - $13 00
With steel tube (Evans), 1⅜ in. i. d. x 1⅝ in. o. d. x 4 ft. 2 in. - 12 50

Weight, 17 lbs.

LEWIS
Fig. 2722

With steel tube, 1 9/16 in. x 1¾ in. x 3 ft. 8 in. - - - - - - - $14 00
With brass tube, 1 9/16 in. x 1¾ in. x 3 ft. 8 in. - - - - - - - 15 00

Weight, 18 lbs.

Brass plunger

With steel tube, 1½ in. x 1¾ in. x 4 ft. 6 in. - - - - - - - - $15 00

Weight, 20 lbs.

ROUGH AND READY
Fig. 2726

DARLING
Fig. 2724

With steel tube, 1½ in. x 1¾ in. x 4 ft. 6 in. - - - - - - - - $20 00
With brass tube, 1½ in. x 1¾ in. x 4 ft. 6 in. - - - - - - - - 22 00

Weight, 20 lbs.

BRUNDRED PLUNGER
Fig. 2728

Furnished loose fit for C. I. workings barrels - - - - - - - - - $12 00

Weight, 18 lbs.

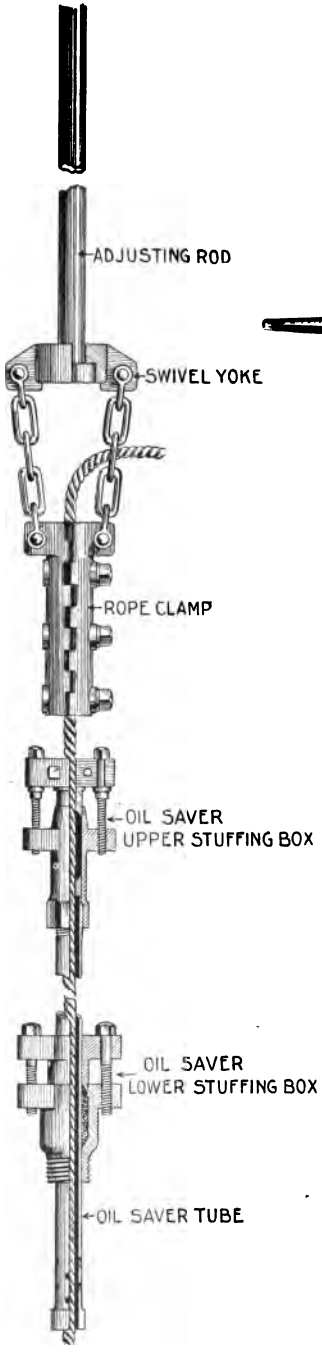
Steel tube

The advantage of the Brundred plunger is that the standing valve is removed with the rods. Used in standard cast iron working barrels only.

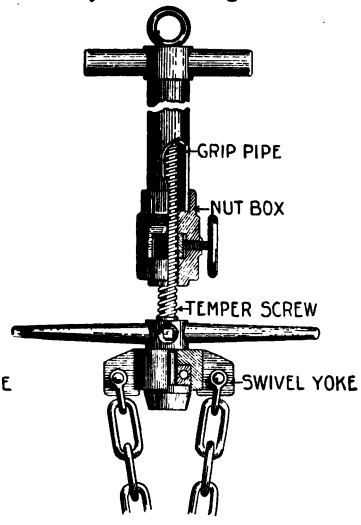
LESCHEN'S WIRE LINE OIL PUMPS

"STANDARD" PUMP
Fig. 2716

UPPER CONNECTIONS
With Adjusting Rod. Fig. 2717



With Temper Screw Adjustment. Fig. 2718



Patent applied for

Patent applied for. For description and lists see next page.

LESCHEN WIRE LINE OIL PUMPS

The Leschen Wire Line Pump, Fig. 2716, is operated with a wire line in the place of the ordinary wood or iron sucker rods.

The pump is of simple construction and is suitable to any well where a regular 2-inch pumping outfit can be used.

The sinkers connecting the traveling valve and the wire line may be made of non-magnetic metal. The sinkers are from 9 to 31 feet in length and can be run into the derrick without unjointing when the valve is pulled to replace cups.

Leschen's "Standard" Wire Line Pump - - - - - - - - - - - - - - - - - $60 00

Consisting of the following: (see Figs. 2716 and 2717):

1 adjusting rod (with swivel yoke, chains and rope hanger)	6 50
1 rope clamp	9 00
1 oil saver, complete	19 00
1 swivel rope socket	10 00
2 iron sinkers, each 15½ ft. long, weight 90 lbs., each $7 00	14 00
1 sinker sub (to connect sinker to working valve)	1 50

Leschen's "Non-Magnetic" Wire Line Pump - - - - - - - - - - - - - - $68 50

Consisting of the following (see Figs. 2716 and 2717):

1 adjusting rod (with swivel yoke, chains and rope hanger)	6 50
1 rope clamp	9 00
1 oil saver, complete	19 00
1 swivel rope socket	10 00
1 "Non-Magnetic" sinker (9 ft. long, weight 90 lbs.)	22 00
1 sinker sub (to connect sinker to rope socket)	2 00

The items in both "Standard" and "Non-Magnetic" pumps as shown in above lists include sinkers. These are sufficient only in wells producing high gravity oil. To obtain proper results in heavier oil more sinkers should be used.

NOTE—With the above outfits either regular Working Barrel Valves, (see page 228), or an O. W. S. Co. (Evans), or a Rough & Ready inserted Working Barrel (see page 219) may be used. For list price on these items see pages referred to.

A Grip Adjuster is also necessary for either outfit; for list price see page 215.

UPPER CONNECTIONS

The upper connections may be provided with a **Temper Screw Adjustment** (see Fig. 2718), by which the position of the valve may be regulated from the derrick floor.

Price, less Grip Pipe and Cross Head - - - - - - - - - - - - - - - - - - - $22 50

For list price on Grip Pipe and Cross Head see page 215.

WIRE LINE PUMP

TAYLOR PATENT

PUMP
Fig. 2719

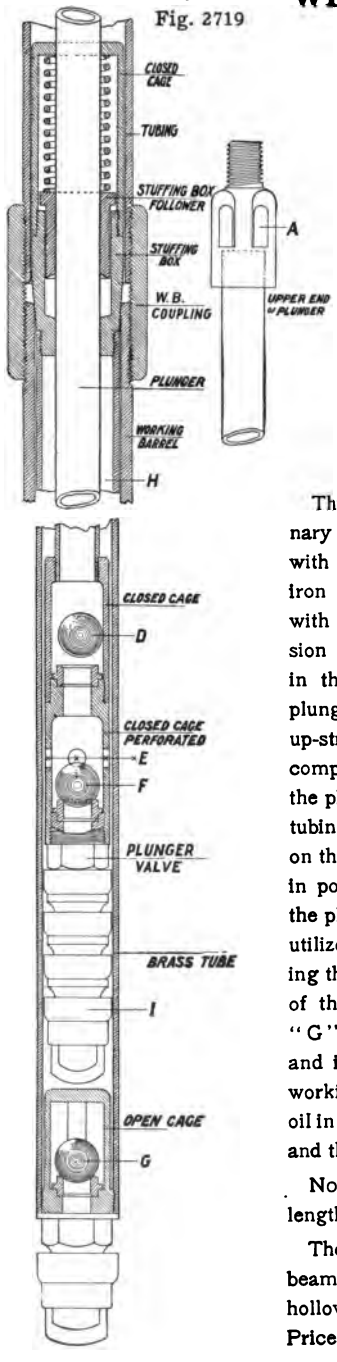
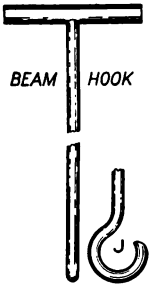


Fig. 2719A



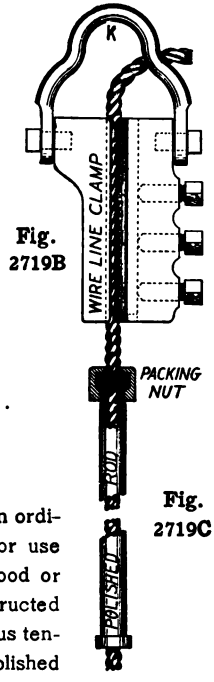


Fig. 2719B

Fig. 2719C

This pump is made to fit or work in an ordinary working barrel, and is designed for use with wire rope instead of the regular wood or iron sucker rods. The pump is constructed with the view of maintaining a continuous tension on the wire rope. This is accomplished in the following manner: Starting with the plunger at the lower limit of the stroke, the oil is drawn by the up-stroke into the pump through the valve "G," and at the completion of the up-stroke the space between the bottom of the plunger and the valve "G" will be filled with oil. As the tubing above the pump fills with fluid, there will be a pressure on the top of the plunger equivalent to the pressure of the fluid in pounds per square inch, multiplied by the sectional area of the plunger, less the sectional area of the rope. This pressure is utilized in maintaining the tension of the wire rope and returning the plunger on the down-stroke. On the downward passage of the plunger the oil which has been drawn through valve "G" is passed up past "I" and "F" through the holes "E" and into the annular space "H" between the plunger and the working barrel. On the following up-stroke of the plunger, the oil in "H" is forced back through holes "E" past the valve "D," and thence through the hollow plunger "A" into the tubing.

NOTE.—It is customary to use one iron sucker rod of ordinary length between lower end of pumping line and plunger valve.

The special equipment consists of the pump, fig. 2719; walking beam hook, fig. 2719A; wire line clamp, fig. 2719B, and the hollow polished rod for 2-inch tubing, fig. 2719C.

Price, complete - - - - - - - - - - - - - - - $50 00

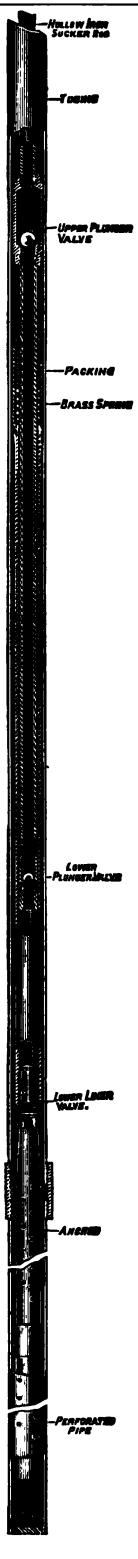


Fig. 2732

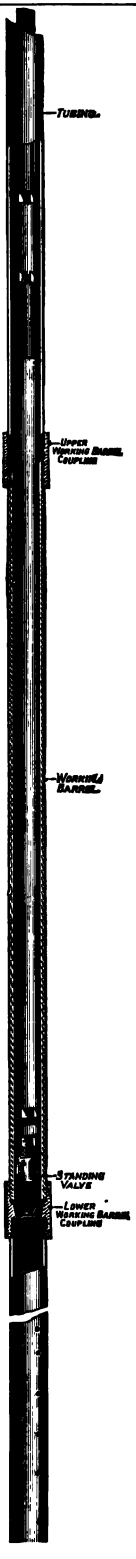


Fig. 2731

O'DELL PUMPING OUTFIT

This outfit is designed for use in gas wells for pumping water or oil which sometimes interferes with the free flow of gas.

The Working Barrel, Fig. 2732, may be lowered to the bottom of the tubing and held in place by the Anchor, or a common working barrel may be used and the Liner, Fig. 2731, inserted therein.

In either case the remainder of outfit would consist of ¾" special tubing, which would take the place of ordinary sucker rods, and the attachments for connecting to walking beam either of Standard Rig or Klein Pumping Power.

As the fluid to be pumped is forced up through the hollow rods, a portion of the polished rod is also hollow to permit the discharge of fluid.

Itemized list of parts as follows:

OUTFIT FOR WALKING BEAM

1 Anchor
1 Perforated Pipe
1 O'Dell Barrel complete
1 Hollow Polished Rod
1 Brass Knuckle Joint
1 Solid Iron Polished Rod
1 Little Giant Adjuster
1 Iron Stuffing Box
1 Check Valve
1 Tee Bolt and Washer
1 Adjuster Board.

Outfit complete for Walking Beam - - - $50 00

Weight, 130 lbs.

OUTFIT FOR KLEIN POWER

Same as for Walking Beam, except that the Tee Bolt, Washer, Adjuster Board and Adjuster are not required.

Outfit complete for Klein Power - - - - $47 00

Weight, 100 lbs.

NOTE.—The above prices do not include the ¾" special tubing.

BRASS WORKING BARREL OR DEEP WELL PUMP

WITH BALL VALVES

Fig. 2691

Our working barrels are made of heavy seamless drawn brass tubing, and are perfectly smooth and true.

The inside diameter of the barrels is smaller than that of the tubing or casing with which they are used, to allow for removing the valves by drawing them up through the tubing when in need of repairs.

The standing or lower valve is packed with leather rings, the working or upper valve with cup-shaped leathers.

For convenience in ordering, we publish in the table herewith the size of tubing, the inside diameter of barrel, the length of stroke; also the capacity in gallons per stroke. Taking the number of strokes per minute, the capacity for any given time can be determined.

Size of tubing, inches	Inside diameter barrel, inches	Outside diameter barrel, inches	Length of barrel, inches	Length of stroke, inches	Capacity per stroke, gallons	Weight, lbs.	Complete with valves	Without valves
1	$\frac{7}{8}$	$1\frac{1}{8}$	48	36	.09	$7\frac{3}{4}$	$13 20	9 00
$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{3}{8}$	48	42	.18	9	14 20	10 00
$1\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{5}{8}$	42	24	.15	10	15 60	10 50
$1\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{5}{8}$	60	42	.27	13	16 10	11 00
2	$1\frac{3}{16}$	$2\frac{1}{6\frac{1}{4}}$	39 s. s.	24	.26	10	14 00	9 00
2	$1\frac{3}{16}$	$2\frac{1}{6\frac{1}{4}}$	60	39	.43	14	18 00	13 00
2	$1\frac{3}{16}$	$2\frac{3}{1\frac{3}{8}}$	42 s. s.	24	.27	20	20 00	15 00
2	$1\frac{3}{16}$	$2\frac{3}{1\frac{3}{8}}$	48	36	.40	23	22 00	17 00
2	$1\frac{3}{16}$	$2\frac{3}{1\frac{3}{8}}$	60	42	.46	28	24 00	19 00
$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	30 s. s.	18	.30	27	33 50	22 50
$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	36 s. s.	18	.30	32	34 25	23 25
$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	42	24	.41	37	37 00	24 00
$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	60	42	.72	44	39 50	26 50
$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	84	64	1.10	59	42 00	29 00
3 or $3\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$	30 s. s.	18	.46	33	43 00	29 00
3 or $3\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$	42	24	.61	47	47 50	31 00
3 or $3\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$	60	42	1.07	56	51 00	34 50
3 or $3\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$	84	64	1.64	74	55 00	38 50
3 or $3\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$	96	76	1.95	105	56 50	40 00
$3\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	36 s. s.	18	.64	40	60 50	38 00
$3\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	60	42	1.50	60	68 00	42 00
$3\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	84	64	2.30	80	72 00	46 00
4 or $4\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$	48 s. s.	36	1.72	59	74 50	44 00
4 or $4\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$	60	42	2.00	70	76 50	46 00
4 or $4\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$	66	42	2.00	72	77 50	47 00
4 or $4\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$	84	64	3.06	90	80 50	50 00
$4\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{3}{4}$	48 s. s.	36	2.21	----	106 50	60 00
$4\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{3}{4}$	66	42	2.58	----	110 50	64 00
5	$4\frac{3}{4}$	$5\frac{1}{4}$	48 s. s.	36	2.76	88	130 00	79 00
5	$4\frac{3}{4}$	$5\frac{1}{4}$	66	42	3.22	110	134 00	83 00
$5\frac{5}{8}$	$5\frac{1}{4}$	$5\frac{3}{4}$	66	42	3.94	120	173 00	104 00
$5\frac{5}{8}$	$5\frac{1}{4}$	$5\frac{3}{4}$	72	45	4.21	131	175 00	106 00
6	$5\frac{3}{4}$	$6\frac{1}{4}$	54 s. s.	36	4.04	108	203 00	118 00
6	$5\frac{3}{4}$	$6\frac{1}{4}$	72	45	5.06	132	209 00	124 00
6	$5\frac{3}{4}$	$6\frac{1}{4}$	96	76	8.54	175	217 00	132 00

NOTE.—S. S. after length of barrel indicates short stroke barrels

WORKING BARRELS

BRASS LINED

Not illustrated

7¾ inches x 8¼ inches x 8 feet, with valves	$600 00
6¾ inches x 7¼ inches x 8 feet, without valves	350 00

PLUNGER WORKING BARRELS

SNOW'S PATENT
Fig. 2694

PLAIN PLUNGER
Fig. 2697

SNOW'S PATENT—Fig. 2694

For 2-inch tubing, **weight, 72 pounds**	$20 00
For 2½-inch tubing	45 00
For 3-inch tubing	60 00

PLAIN PLUNGER—Fig. 2697

For 2-inch tubing, with plain plunger	$25 00
For 2-inch tubing, with corrugated plunger	26 00

Weight, 64 pounds.

PARTS FOR 2-INCH PLUNGER WORKING BARRELS

Diaphragms	$8 00
Plungers, complete	8 00
Bottoms	2 00
Standing valves	2 10
Upper plunger valves	2 00
Lower plunger valves	1 75
Plungers, less valves	5 00
Upper valve cages	1 25
Standing valve cages	1 00
Balls	35
Seats	75
Leathers	75
Pipes	1 50

PERFORATED PIPE

Fig. 2675

Size - - - inches	2	2½	3	3½	4
Weight per foot - - - lbs.	**3.61**	**5.74**	**7.54**	**9**	**10.66**
Per foot	$0 50	75	1 00	1 15	1 25

WORKING BARREL SCREEN AND REMOVABLE WELL LINER

Fig. 2734

The oil-producing formation in many wells is of a soft, friable nature, which gradually crumbles and fills the lower part of the well, thus diminishing the production and in many instances cutting it off entirely.

This has been overcome by inserting a perforated liner of suitable length to cover the producing area or "pay streak." The loose sand gradually works through the perforations and fills the space occupied by the working barrel, and the only remedy is to withdraw the tubing and clean the well. The cleaning process is retarded and only imperfectly accomplished by reason of the reduced diameter of the well resulting from the use of the liner.

Fig. 2734 represents a device which accomplishes the desired result of screening the oil before it reaches the valves, and is so constructed that it is readily withdrawn with the tubing, thus permitting the use of "cleaning out" tools of full size of the well.

DESCRIPTION

A.—Short piece of tubing of suitable length to pass between sustaining point D and admit tubing elevator between upper B and F.

B. B.—The tubing coupling on either end of A, forming a jar or knocker, by which the entire device may be jarred loose in event of sand settling and sticking it in the well.

C.—Upper portion of the body or screen, usually not perforated.

D. D.—Couplings of the screen, which is usually made about twenty-eight feet in length.

E.—Lower end of screen, perforated to admit oil and shut out the loose caving sand; this lower end is made with a projectile point to permit the easy withdrawal from well after sand has settled around it.

G.—Showing location of working barrel inside of screen.

F.—Upper part of screen, made of heavy forging. This is made of suitable size for easy passage of the tubing, and lower end has shoulder resting on upper end of C, which sustains the weight of the device.

H.—Perforated pipe attached below the working barrel.

Weight, 285 lbs.

Prices on application.

STRAINERS

Fig. 2221

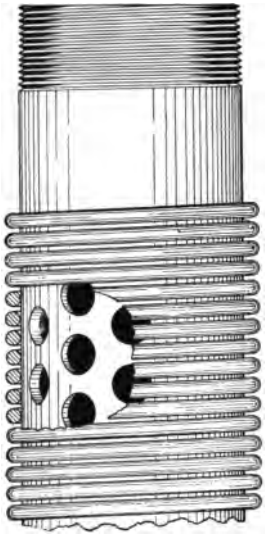


Fig. 2222

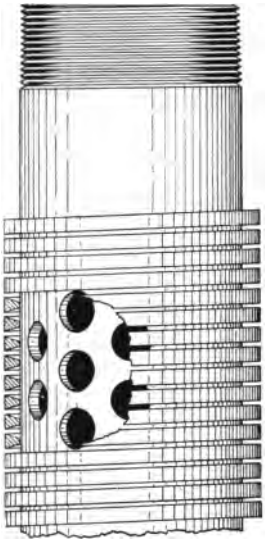
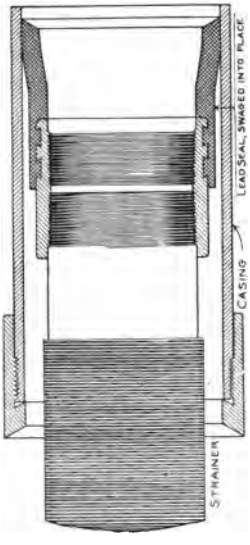


Fig. 2223



Size Pipe - - - inches	2	2½	3	3½	4	4½	5	6	8
Common wire Fig. 2221 - - per ft.	1 00	1 10	1 25	1 40	1 50	1 65	1 80	2 25	3 75
Special wire Fig. 2222 - - per ft.	2 00	2 20	2 35	2 50	2 60	2 70	2 80	3 00	4 75
Lead Seal Fig. 2223 - - - each -	Prices on Application.								

WORKING BARREL VALVES

WITH STEEL OR BRASS SEATS

UPPER OR WORKING BRASS VALVE Fig. 2735

LOWER OR STANDING BRASS VALVE Fig. 2737

FOUR-CUP UPPER STEEL VALVE Fig. 2747

LOWER STEEL VALVE Fig. 2745

BRASS VALVES

Size of tubing - in.	1	1¼	1½	2	2	2½	3	3½	4	4½	5	5⅝	6
Inside diameter of barrel - - in.	⅞	1⅛	1⅜	1½	1 1⅜	2¼	2¾	3¼	3¾	4¼	4¾	5¼	5¾
Upper, fig. 2735	$2 35	2 35	3 00	3 50	2 90	7 75	9 50	15 75	18 25	28 00	30 50	41 50	50 00
Lower, fig. 2737 -	1 85	1 85	2 10	2 00	2 10	5 25	7 00	10 25	12 25	18 50	20 50	27 50	32 00
Per set - - - - -	4 20	4 20	5 10	5 50	5 00	13 00	16 50	26 00	30 50	46 50	51 00	69 00	82 00

LIST OF PARTS FOR UPPER AND LOWER WORKING BARREL VALVES

Size of tubing - - - inches		1¼	1½	2	2	2½	3	3½	4	4½	5	5⅝	6
Inside diameter of bbl. - inches		1⅛	1⅜	1½	1 1⅜	2¼	2¾	3¼	3¾	4¼	4¾	5¼	5¾
Upper crowns - -	brass	$0 75	75	85	85	1 25	2 25	3 00	4 00	5 75	6 00	8 00	9 75
	steel	-----	----	----	1 00	1 50	2 50	5 50	7 50	----	----	----	-----
Lower crowns - -	brass	85	85	85	85	1 25	2 25	3 00	4 00	5 75	6 00	8 00	9 75
	steel	-----	----	----	1 00	1 50	2 50	5 50	7 50	----	----	----	-----
Barrels for upper valves	brass	1 00	1 00	1 10	1 10	1 65	2 75	4 50	5 00	7 00	8 00	9 00	10 00
	steel	----	----	----	----	----	----	----	----	----	----	----	-----
Barrels for lower valves	brass	65	65	75	75	1 35	2 00	3 00	3 50	5 50	6 00	8 00	9 00
	steel	-----	----	----	----	----	----	----	----	----	----	----	-----
Perforated crowns for upper and lower valves	brass	-----	----	----	1 25	2 50	3 75	----	----	----	---	----	-----
	steel	-----	----	----	3 00	4 50	6 00	----	----	----	----	----	-----
Lower parts or loops for upper valves - - -	brass	35	35	40	40	65	90	1 50	1 75	3 00	3 25	4 50	5 00
	steel	-----	----	----	90	1 50	2 00	----	----	----	----	----	-----
Perforated lower parts for upper valves - - -	brass	-----	----	----	75	1 50	2 25	----	----	----	----	----	-----
	steel	-----	----	----	1 75	3 00	4 00	----	----	----	----	----	-----
Cup rings - - - - - -	brass	25	25	25	25	40	55	75	85	1 35	1 50	2 00	2 50
	steel	-----	----	----	60	1 00	1 35	1 75	2 00	----	----	----	-----

STEEL VALVES

Size - - - inches	1¾	2¼	2¾
Upper, fig. 2747 - -	$6 50	13 00	17 00
Lower, fig. 2745 - -	4 50	11 00	14 50
Per set - - - - - -	11 00	24 00	31 50

VALVES WITH STEEL CROWNS, BALLS AND SEATS

Size - inches	1 1⅜	2¼	2¾	3¼	3¾
Upper - -	$3 50	8 75	10 50	17 00	19 50
Lower - -	2 25	6 00	7 75	10 50	13 50
Per set - -	5 75	14 75	18 25	27 50	33 00

WORKING BARREL VALVES

Fig. 2739

Two-cup lower valve, with leather rings.

Fig. 2743

Two-cup lower valve, without leather rings.

Fig. 2741

One-cup lower valve.

1¾-INCH TWO-CUP LOWER VALVE WITH STEEL BALL AND SEAT

With leather rings and brass crown	$3 50
With leather rings and steel crown	4 25
Without leather rings, with brass crown	3 25
Without leather rings, with steel crown	4 00

1¾-INCH ONE-CUP LOWER VALVE WITH STEEL BALL AND SEAT

With leather rings and brass crown	$3 00
With leather rings and steel crown	3 75
With bottom tapped for ¾-inch iron pipe, add to above lists	75
With brass ball instead of steel, add to above lists	15

DOUBLE BALL VALVES

Fig. 2750

Upper

Fig. 2752

Lower

Inside diam. of barrel, in.	Price, upper valve	Price, lower valve
1¾	$7 00	4 00
2¼	11 00	7 00
2¾	13 00	11 50
3¼	15 00	15 00

SPECIAL VALVES FOR SHORT STROKE WORKING BARRELS FOR WATER WELLS

Not illustrated

Inside diam. bbl., in.	1⅜	1 1⅜	2¼	2¾	3¼	3¾	4¼	4¾	5¼	5¾
Upper	------	$2 50	6 50	8 50	13 50	17 00	25 25	27 50	34 00	40 00
Lower	------	1 75	4 50	5 50	9 00	11 50	16 75	18 50	23 00	27 00
Per set	------	4 25	11 00	14 00	22 50	28 50	42 00	46 00	57 00	67 00

REVERSIBLE VALVE SEAT—Fig. 2794

VALVE BALL—Fig. 2810

Size valve for inches	1⅛	1⅜	1½	1 1⅜	2¼	2¾
Diameter of ball inches	⅝	⅞	1	1⅛	1½	1¾
Brass balls	$0 30	35	40	40	90	1 25
Steel balls	20	25	30	30	60	90
Rerersible brass seats	25	25	30	40	60	75
Reversible steel seats	20	20	20	30	40	45

Size valve for inches	3¼	3¾	4¼	4¾	5¼	5¾
Diameter of ball inches	2 5/8	2¾	3	3½	3¾	4 5/16
Brass balls	$1 50	2 25	3 00	3 25	5 00	6 50
Steel balls	2 50	4 50	6 00	10 00	----	
Reversible brass seats	2 00	2 50	3 00	-----	----	----
Reversible steel seats	50	1 50	----	-----	----	----

FLEMING SAND VALVE

Fig. 2758

Placed below the working barrel to separate sand from fluid. The sand pocket is formed by screwing a piece of tubing, with a cap on the lower end, into the bottom of the valve, and takes the place of the perforated pipe; any sand entering with the oil drops past the valve into this pocket.

Price, 1¾ inch - $6 00

UPPER OR WORKING VALVES

FOR USE IN WELLS THAT CONTAIN SAND

KIFER
Fig. 2781

To expand the packing rings after they become worn, the valve is lowered until the lugs on the bottom engage in the top of the lower valve; the rods are then revolved (right-handed) until rings are sufficiently expanded.

ROPE
Fig. 2754

The rope packing is expanded by screwing down the top.

LEWIS
Fig. 2783

The rubber rings are expanded by screwing down the top.

LANDAS
Fig. 2756

The rope packing is kept constantly expanded by a sliding follower with a coil spring above.

Inside diam. of barrel, in.	1¾	2¼	2¾	3¾
Kifer, fig. 2781 - - - - -	$12 00	----	----	----
Rope, fig. 2754 - - - - -	5 00	8 00	----	----
Extra rope for rope valve -	15	20	----	----
Lewis, fig. 2783 - - - -	7 50	12 35	----	----
Landas, fig. 2756 - - -	8 00	15 00	25 00	40 00

PARTS OF LEWIS VALVE

Size valve for - - inches	1¾	2¼
Bottom, with seat - -	$1 50	3 00
Bottom, with seat and strainer - - - - - -	2 00	4 00
Balls, brass - - - - -	50	----
Balls, steel - - - - -	70	----
Rings, leather - per set	75	----
Rings, linen - per set	75	2 50

PARTS OF LANDAS VALVE

Size valve for, inches	1¾	2¼	2¾	3¾
Balls - - - - - -	$0 40	1 25	1 75	2 00
Seats - - - - - -	40	80	1 00	1 75
Locknuts - - - - -	40	60	1 25	2 00
Followers - - - - -	2 00	3 00	4 00	6 50
Springs - - - - -	80	1 00	1 75	2 00
Set screws - - -	10	10	20	25
Tubes - - - - - -	1 50	3 25	6 00	9 00
Cages - - - - - -	1 00	2 50	5 00	8 00
Bottoms - - - - -	50	1 00	2 50	4 00
Seat frames - - -	1 00	1 50	2 75	4 50

Cord for Landas valve, cotton - per foot. $0 02½
Cord for Landas valve, hemp - per foot, 03

"HERRON SPECIAL" VALVE CROWN

UPPER

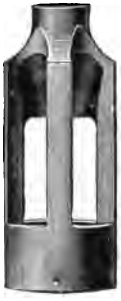
Fig. 2759

TOP VIEW

Fig. 2761

LOWER

Fig. 2760



Designed for pumping heavy oils. The valve ball cannot "stick" against the top of the crown, as the side openings are cut at an angle, permitting the downward pressure of the fluid to act on the ball, forcing it to the seat.

Size valve for - - - - - - - - - - inches	1¾	2¾
Upper valve - - - - - - - - - - - - -	$2 25	5 25
Lower valve - - - - - - - - - - - - -	2 25	5 25

CROWN

Fig. 2811

SOLID VALVE

Fig. 2812

SEAT

Fig. 2813

EVERLASTING VALVE CROWN, VALVE, AND SEAT

Size valve for - - - - - inches	1¾	2¼	2¾
Complete - - - - - - - - -	$2 00	3 00	4 00
Crown only - - - - - - - -	1 50	2 25	3 00
Valve only - - - - - - - -	30	50	70
Seat only - - - - - - - - -	25	40	50

Fig. 2784

THE BETTS VALVE

For attaching to lower coupling of working barrel, serving as a double check. Particularly adapted for use in oil wells producing large quantities of water.

Size - in.	2	2½	3
Price - -	$7 00	10 00	22 50

HUGHES' UPPER VALVE

Fig. 2768

The rubber packing is distended by the cone.

Inside diameter of barrel, inches	1¾	2¼	2¾
Price, complete -	$8 50	14 00	18 00

PARTS OF HUGHES' VALVE

Size - - - - - - inches	1¾
Cone only - - - - - -	$0 20
Steel rings - - - - - -	60
Body, with steel seat - -	3 50
Rubbers - - - - - -	50

BEERS BROS. EXTENSION VALVE

Size tubing for - - - - - - - - - - inches	2	2½	3	4
Complete - - - - - - - - - - - each	$5 00	12 00	15 00	30 00
Tops only - - - - - - - - - - - "	2 50	7 00	8 00	20 00
Bottoms only - - - - - - - - - - "	2 00	4 00	6 00	10 00
Drops only - - - - - - - - - - - "	1 00	1 10	1 25	3 00
Seats only - - - - - - - - - - - "	1 00	1 10	1 25	2 50

KINNEY GAS—UPPER VALVE

Fig. 2790

This valve is used for pumping fluid where the pressure of gas prevents the ball in a regular valve from working properly.

Inside diameter of barrel - - - - inches	1¾	2¼	2¾
Price - - - - - - - - - - - - - -	$9 00	14 50	21 00

VALVE CUPS

LEATHER
Fig. 2798

BOW SPRING
Fig. 2804

METALLIC
Fig. 2806

Size - - - - inches	⅞ to 1½	1 1⅛	2¼	2¾	3¼	3¾	4¼	4¾	5¼	5¾	6¾	7¾
Leather, fig. 2798 - -	$0 05	05	15	25	38	45	1 00	1 20	1 40	1 50	2 25	2 50
Rubber - - - - - -	----	20	40	--	--	--	----	----	----	----	----	----
Never cut - - - -	11½	15	18¾	25	--	--	---	----	---	----	----	---
Bow spring, fig. 2804	09	12	20	25	50	60	----	---	----	----	----	----
Metallic fig. 2806 - - -	10	12	20	25	--	--	----	---	---	----	----	----
Everlasting - - - - -	----	10	12	14	--	--	----	----	----	----	----	----
Acme - - - - - - -	----	14	19	26	--	--	----	---	----	----	----	----
Graphite - - - - - -	----	20	40	50	--	--	----	---	----	----	---	----

LEATHER VALVE RINGS

Size valves for, inches	⅞	1⅛	1⅜	1 1⅛	2¼	2¾	3¼	3¾	4¼	4¾	5¼	5¾
Price - - - per 100	$0 75	85	90	1 00	2 40	3 00	5 25	7 00	10 00	13 00	14 50	16 00

CASING CUPS

Size - - inches	4	4¼	4½	4¾	5	5¼	5½	5⅝	6	6¼
Price - - - - - -	$0 90	1 00	1 10	1 25	1 25	1 50	1 50	1 50	1 65	1 75
Size - - inches	6½	6⅝	6¾	7	7¼	7½	7¾	8	8¼	8⅝
Price - - - - - -	$1 75	1 90	1 90	2 00	2 00	2 15	2 25	2 50	2 50	3 25

PUMP CUPS

Size - - inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Price - - - - - -	$0 05	15	25	38	45	1 00	1 20	1 40	1 75	2 50	3 50

CROCKER CHECK VALVE WITH ROD

Fig. 2785

CROCKER CHECK VALVE AND PARTS

STEEL SEAT

Fig. 2788

Size - - - - - - - - - - - - inches	1¾	2¼	2¾	3¼	3¾
Valve, complete with rod and connections -	$7 25	12 00	18 50	22 00	28 75
Valve only - - - - - - - - - - - - -	6 00	10 00	15 50	17 00	23 00
Steel check - - - - - - - - - - - -	60	1 50	2 00	2 50	3 25
Brass check - - - - - - - - - - - -	75	------	------	------	------
Crown - - - - - - - - - - - - - - -	1 00	2 00	2 75	3 25	3 75
Upper connections, iron - - - - - - - -	50	65	75	1 25	1 50
Lower connections, iron - - - - - - - -	50	65	75	1 25	1 50
Upper connections, brass - - - - - - - -	75	------	------	------	------
Lower connections, brass - - - - - - - -	75	------	------	------	------
Iron rods - - - - - - - - - - - - - -	50	1 00	2 00	3 00	3 50
Steel seats, fig. 2788 - - - - - - - - -	50	------	------	------	------

Fig. 2777

TAP TO DRAW LOWER VALVE

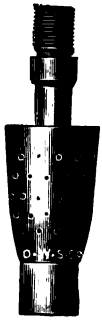
Size valve for - - - inches	1¾	2¼	2¾
Price - - - - - - - - - -	$2 30	2 50	3 00

Fig. 2779

VALVE REAMER

For valves 1¾-inches and smaller -	$2 00
Special fine cut for 1¾-inch and smaller - - - - - - - - - - - - - - - -	2 50
For 2-inch tubing -	3 50

Fig. 2808



RIVET CATCHER

Size - - - - - - - - - Inches	1¾	2¼	2¾	3¼	3¾	4¼
With brass bowl - - - - - - - - -	$2 50	2 75	3 50	4 00	5 00	6 00
All steel - - - - - - - - - - -	3 25	3 50	4 00	5 00	6 50	------
Steel stem only - - - - - - - - -	85	1 00	1 25	1 50	1 85	2 25
Steel bowl only - - - - - - - - -	2 50	2 60	3 00	3 75	5 00	------

IRON PONY RODS

For either fig. 2683 or 2682, page 235

$\frac{9}{16}$-inch, 4, 6, and 8 feet long	$0 60
$\frac{5}{8}$-inch, 4, 6, and 8 feet long	75
$\frac{11}{16}$-inch, 4, 6, and 8 feet long	1 00
$\frac{3}{4}$-inch, 4, 6, and 8 feet long	1 50
$\frac{7}{8}$-inch, 4, 6, and 8 feet long	2 00

SUCKER (OR PUMP) ROD JOINTS

STANDARD SIZES

Fig. 2827

Number	00	0	1	2	3	4	5	6
Size of box and pin - - inches	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$ h'vy	1	1 h'vy
Number threads per inch - - -	12	12	12	10	10	10	10	10
Size of wood - - - - inches	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{5}{8}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{7}{8}$
Number of rivet holes - - - -	3	4	5	5	6	6	6	7
Diameter of rivet - - - inches	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{5}{16}$
Length of rivet - - - - inches	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	2	$2\frac{3}{8}$	$2\frac{1}{2}$
Size of square for wrench, inches	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1	1
Length of straps - - - inches	8	11	$15\frac{1}{4}$	16	18	18	20	20
Total length of joint - - inches	21	27	36	39	43	44	47	47
Nominal weight - - - - lbs.	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{7}{8}$	$5\frac{1}{2}$	$6\frac{1}{2}$	$7\frac{1}{2}$	8	$8\frac{7}{8}$
Black - - - - - - - - -	$0 40	40	40	55	55	70	85	90
Galvanized - - - - - - - -	60	60	60	1 00	1 00	1 15	1 25	1 35

Number	$6\frac{1}{2}$	8	9	10	11	12	13
Size of box and pin - - - - - inches	1	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	2
Number threads per inch - - - - - -	10	8	8	8	----	----	----
Size of wood - - - - - - inches	$1\frac{7}{8}$	$2\frac{1}{2}$	$2\frac{7}{8}$	$3\frac{1}{2}$	4	$4\frac{1}{4}$	$4\frac{1}{2}$
Number of rivet holes - - - - - -	8	7	7	7	7	7	7
Diameter of rivet - - - - - inches	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{5}{8}$	$\frac{5}{8}$
Length of rivet - - - - - - inches	$2\frac{1}{2}$	3	$3\frac{1}{16}$	$3\frac{7}{8}$	----	----	----
Size of square for wrench - - - inches	1	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$
Length of straps - - - - - - inches	22	22	24	24	24	28	34
Total length of joint - - - - - inches	52	53	58	60	60	68	84
Nominal weight - - - - - - - lbs.	12	$19\frac{1}{8}$	24	$26\frac{1}{2}$	40	50	110
Black - - - - - - - - - -	$1 50	2 25	3 00	3 75	6 00	8 00	33 00
Galvanized - - - - - - - - -	2 25	3 25	----	----	----	----	----

SPECIAL SUCKER ROD JOINTS

Not kept in stock

Number	$3\frac{1}{4}$	5	6	7	$7\frac{1}{4}$	8	$8\frac{1}{2}$	9	10	N.Y.	N.Y.
Size of box and pin - inches	1	1	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Number threads per inch - -	10	10	10	8	8	8	8	8	8	11	10
Size of wood - - - inches	$1\frac{5}{8}$	$1\frac{5}{8}$	$1\frac{5}{8}$	$1\frac{7}{8}$	$2\frac{1}{4}$	2	2	2	$2\frac{1}{2}$	1	1
Number of rivet holes - - -	6	6	7	7	6	7	9	7	7	3	3
Size of rivet - - - inches	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{8}{16}$	$\frac{8}{16}$
Length of rivet - - inches	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{5}{16}$	$2\frac{11}{16}$	$2\frac{13}{16}$	$2\frac{13}{16}$	$2\frac{13}{16}$	$3\frac{5}{16}$	$1\frac{1}{4}$	$1\frac{1}{4}$
Size of sq. for wrench, inches	$\frac{7}{8}$	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$
Length of strap - - inches	18	20	20	24	20	26	28	26	26	8	8
Total length of joint - inches	43	47	47	56	48	61	65	62	64	21	21
Nominal weight - - - lbs.	$6\frac{1}{2}$	8	$9\frac{1}{4}$	$14\frac{1}{2}$	13	21	23	$26\frac{1}{2}$	29	$2\frac{1}{4}$	$2\frac{1}{2}$
Price - - - - - - - - -	$0 75	1 00	1 10	1 75	2 00	2 50	2 75	3 50	4 00	50	60

WOODEN SUCKER OR PUMP ROD

Fig. 2680

Size - - - - - - - - - - - - - - - - inches	1⅝	1⅝	1⅞	2¼	3½
Number of rivets - - - - - - - - - - - - - -	5	6	7	6	7
Size of box and pin - - - - - - - - - - - inches	⅞	⅞	1	1⅛	1½
Size tubing for - - - - - - - - - - - - inches	2, 2½	2, 2½	2½, 3	3 to 4	5, 6
Weight per 100 feet - - - - - - - - - - **lbs.**	**105**	**110**	**150**	**250**	----
Fig. 2680 - - - - - - - - - - - - - - per foot	---	----	----	----	----
WOOD PONY RODS - - - - - - - - - - - -	$1 50	1 50	2 00	2 75	----

SOLID IRON SUCKER ROD

Fig. 2682

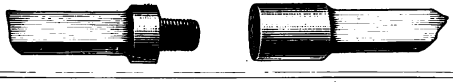
Round iron or steel for small tubing.

Size - - - - - - - - - - - - - - - - inches	9/16	9/16	⅝	11/16	¾	⅞
Size of box and pin - - - - - - - - - - inches	¾	1⅛	1⅛	1 5/16	1 5/16	1¼
Size tubing for - - - - - - - - - - - inches	1¼ 1½	2	2	2, 2½	2½	2½, 3
Weight per 1,000 feet - - - - - - - - - **lbs.**	**910**	**910**	**1,125**	**1,350**	**1,700**	**2,250**
Per foot - - - - - - - - - - - - - -						

Prices on application

STUB JOINT FOR WELDING TO IRON ROD

Fig. 2841



Number - - - - - - -	39	40	42	45	47	48	49	50	51	52	53	SPECIAL P. H. Co. 40	42	41	43
Size of box and pin, inches	9/16	⅝	⅞	1	1⅛	1¼	1⅜	1½	1¾	1¾	2	⅝	⅞	¾	¾
Number threads per inch -	14	12	10	10	8	8	8	8	--	--	--	11	10	11	12
Size of rod, hollow - inches	--	--	¾	1	--	1¼	1½	2	--	2½	--	--	--	--	--
Size of rod, solid - inches	7/16	9/16	--	--	1	--	--	--	--	--	--	--	--	--	--
Size of sq. for wrench, inches	7/16	⅝	⅞	1	1¼	1⅜	1⅜	1½	1¾	2	2¼	--	--	--	--
Length of joint - - inches	8	8	9	9½	11	12	13	14	17½	17½	24	--	--	--	--
Nominal weight - - - **lbs.**	1	1¼	2⅜	3	5⅝	7	9¼	11	20	25	40	--	--	--	--
Price, fig. 2841 - - - -	$0 20	20	30	35	55	60	90	1 25	4 50	4 75	7 50	20	35	25	25

AJAX AND ACME IRON SUCKER ROD

Fig. 2683

Size rods - - - - - - - - - inches	½	9/16	9/16	⅝	11/16	¾	⅞
Size of box and pin - - - - - inches	⅝	¾	1⅛	1⅛	1¼	1¼	1¼
Size tubing for - - - - - - inches	1¼	1¼, 1½	2	2	2½	2½	3
Weight per 1000 feet - - - - - **lbs.**	**720**	**910**	**910**	**1,125**	**1,350**	**1,700**	**2,250**

Prices on application

STUB JOINT

FOR WELDING TO AJAX OR ACME IRON SUCKER RODS

Fig. 2844

Size rods - - - - - - - - - - - inches	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{8}$	$1\frac{1}{16}$	$\frac{3}{4}$	$\frac{7}{8}$
Size box and pin - - - - - - - - - inches	$\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{5}{16}$	$1\frac{5}{16}$	$1\frac{1}{4}$
Price - - - - - - - - - - - - - - - -	$0 60	60	75	1 00	1 50	2 00

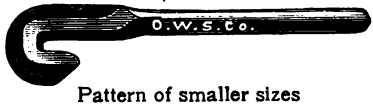
SUCKER ROD TOOLS

SUCKER ROD ELEVATORS—Fig. 2863

For size square, inches	For No. joint	Weight, lbs.	Per set	Weight, lbs.	Per set	Weight, lbs.	Per set	Weight, lbs.	Per set	Weight, lbs.	Per set
$\frac{5}{8}$	00, 0, 1	20	$6 25	--	----	--	------	--	------	--	------
$\frac{7}{8}$	2, 3, 4	20	6 50	30	$8 00	45	$11 00	--	------	--	------
1	5, 6	20	6 75	30	8 25	45	11 75	--	------	--	------
$1\frac{1}{4}$	7	20	7 00	30	8 50	45	12 00	--	------	--	------
$1\frac{3}{8}$	8, 9	--	----	30	8 75	45	12 50	--	------	--	------
$1\frac{1}{2}$	10	--	----	--	----	45	13 00	--	------	--	------
$1\frac{3}{4}$	11	--	----	--	----	45	13 50	--	------	--	------
2	12	--	----	--	----	-	------	60	$16 00	--	------
$2\frac{1}{4}$	13	--	----	-	----	--	------	--	------	75	$18 00

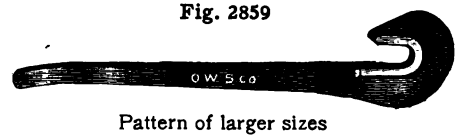
SUCKER ROD WRENCHES

Fig. 2855



Pattern of smaller sizes

Fig. 2859



Pattern of larger sizes

No.		Weight, lbs.	Size of square, inches	Price
1	For Nos. 00, 0 and 1 S. R. joint - - - - - - - - -	3	$\frac{5}{8}$	$0 50
3	For Nos. 2, 3, 4 S. R. joint - - - - - - - - - -	4	$\frac{7}{8}$	55
5	For Nos. 5 and 6 S. R. joint - - - - - - - - -	4	1	1 00
7	For No. 7 S. R. joint - - - - - - - - - - - -	12	$1\frac{1}{4}$	2 00
9	For Nos. 8 and 9 S. R. joint - - - - - - - - - -	14	$1\frac{3}{8}$	2 00
10	For No. 10 S. R. joint - - - - - - - - - - -	27	$1\frac{1}{2}$	2 50
11	For No. 11 S. R. joint - - - - - - - - - - -	30	$1\frac{3}{4}$	4 50
12	For No. 12 S. R. joint - - - - - - - - - - -	40	2	6 00
13	For No. 13 S. R. joint - - - - - - - - - - -	60	$2\frac{1}{4}$	8 00
----	Jumbo, not illustrated - - - - - - - - - - -	----	----	2 25

SUCKER ROD HOOK

Fig. 2684

Size rods for - - - inches	$1\frac{5}{8}$	$1\frac{5}{8}$, $1\frac{7}{8}$	$1\frac{5}{8}$, $1\frac{7}{8}$, $2\frac{1}{4}$	$2\frac{1}{4}$, $3\frac{1}{2}$
Weight - - - - - - lbs.	**5**	**10**	**15**	**20**
Price - - - - - - - - -	$1 25	1 50	2 50	3 50

SUCKER ROD TOOLS

Fig. 2687

BALL BEARING SWIVEL HOOK

PARTICULARLY ADAPTED FOR USE WITH WIRE LINE

Capacity - - - - - - - lbs.	300	500	1,000	2,000	4,000	5,000
Size of shaft through B. B. cup, in.	¼	⅜	⅝	¾	1	1⅛
Length of swivel complete - - in.	4½	5	8	9	12	13
Price - - - - - - - - - - -	$0 50	1 00	5 00	5 50	8 00	9 00
Capacity - - - - - - - lbs.	6,000	8 000	10,000	14,000	18,000	25,000
Size of shaft through B. B. cup, in.	1¼	1⅜	1½	1¾	2	2½
Length of swivel complete - - in.	14	16	18	20	24	36
Price - - - - - - - - - - -	$10 00	11 00	20 00	30 00	40 00	75 00

SUCKER ROD RIVETERS

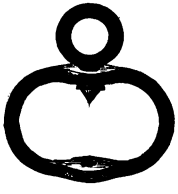
Fig. 2871

Fig. 2873

Size rod for - - - - - - - - inches	1⅝	2¼
Weight - - - - - - - - - - lbs.	14	14
Fig. 2871 - - - - - - - - - - -	$3 00	4 00
Fig. 2873 - - - - - - - - - - -	2 50	3 50

SUCKER ROD SWIVEL

Fig. 2876



Size pin, in.	Weight, lbs.	Price
9/16	8	$1 25
⅞	10	2 35
1	12	2 50
1⅛, 1¼	14	5 50
1½	16	6 50

SUCKER ROD CLEANERS

Fig. 2878

Complete

Fig. 2879

Rubber

Fig. 2881

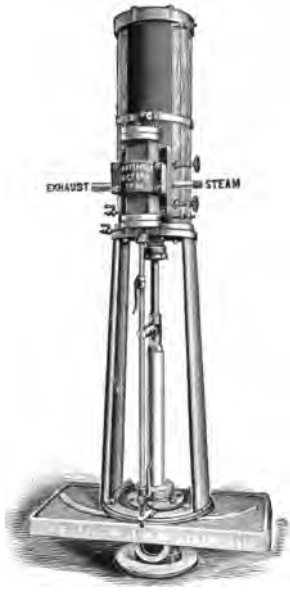
Fig. 2878 - - - - - - - - - - $4 00	Fig. 2881 - - - - - - - - - - $4 00
Weight - - - - - - - - lbs., 12	Weight - - - - - - - - lbs., 7
Extra rubbers, fig. 2879 - - - - - 1 25	Extra rubbers - - - - - - - - - 1 25

For sucker rod lines, see pages 131 and 132

SUCKER ROD BIT—Fig. 5584

No. 4 - - - - - - - per dozen, $1 46	No. 6 - - - - - - - per dozen, $1 70
No. 5 - - - - - - - per dozen, 1 58	⅜-inch diameter - - - per dozen, 2 50

Fig. 3229



DIRECT-ACTING ARTESIAN OR DEEP WELL PUMPING ENGINE

THE LATEST PATTERN OF COOK'S VERTICAL DIRECT-ACTING PUMPING ENGINE

It has no "dead center," always starting when steam is turned on. These engines will work without shock or jar, as the amount of steam for downward or upward strokes can be regulated by the engineer. There being separate adjustable valves for upward and downward strokes, a perfectly uniform motion is produced without regard to weight of the reciprocating parts. It is especially designed for non-flowing artesian or tube wells, where water does not rise to within drafting distance of the surface, and will successfully raise water from the deepest wells. The pump bucket discharging on the upper stroke and the top plunger, shown in cut, discharging on the down stroke, make the flow of water steady and continuous. The cut shows the manner in which pump is repaired; thus: Removing the lower key from crosshead and three of the bolts from the base, the engine revolves on the fourth bolt entirely to one side, allowing sufficient room to withdraw the rods and working parts of the pump.

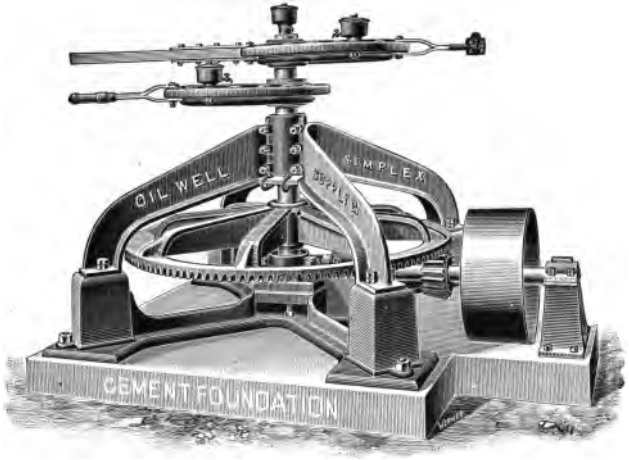
Diameter of steam cylinder - inches	4	5	6	8	10
Length of stroke - - - - - inches	24	24	24	24	24
Weight - - - - - - - - - - **lbs.**	**535**	**800**	**900**	**1,325**	**1,525**
Price - - - - - - - - - - - -	$130 00	145 00	160 00	240 00	285 00
Diameter of steam cylinder - inches	6	8	10	12	14
Length of stroke - - - - - inches	36	36	36	36	36
Weight - - - - - - - - - - **lbs.**	**975**	**1,525**	**1,725**	**2,240**	**2,600**
Price - - - - - - - - - - - -	$200 00	275 00	310 00	420 00	520 00

SURFACE EQUIPMENT FOR PUMPING WELLS

This includes all material required for connecting a group of wells to pumping power. The illustrations following show the various forms of our regular pumping equipment, and which we are making in standard weights and sizes to suit the requirements of the different oil fields.

Orders for "special" pumping equipment should be accompanied by sketches showing design and size of material required.

SURFACE EQUIPMENT FOR PUMPING WELLS



SIMPLEX PUMPING POWER

Fig. 3321

Length of bed plate, 6 ft. 3 in
Width of bed plate, 6 ft. 3 in.
Height of frame - 5 ft. 10 in.
Diam. of large gear, 6 ft. 0 in.
Diameter of pinion - 11 in.
Diameter of main shaft, 5 in.

Shipping weight, 6,100 lbs.

Complete with two eccentrics - $315 00

The Simplex power has but two parts in the frame. It is of desirable height, and both eccentrics being above the frame, make it possible to connect from any angle. All bearings are large and powerful, and of the best material and workmanship.

Steel shafting, anti-friction washers, patent step box with adjustment, dead-line connections for hooking on wells, sight-feed cups, self-oiling eccentrics, out-end bearing, and necessary hand holes for removing bolts.

PYRAMID PUMPING POWER

Fig. 3341

No. 1 PYRAMID POWER

Horizontal shaft - - - 3½ in. x 7 ft. 3 in.
Vertical shaft - - - - 4 15/16 in. x 5 ft. 6 in.
Diameter of large gear - - - - 7 ft. 0 in.
Diameter of pinion - - - - - - 11½ in.

No. 2 PYRAMID POWER

Horizontal shaft - - - 3½ in. x 4 ft. 6 in.
Vertical shaft - - - - 4½ in. x 5 ft. 6 in.
Diameter of large gear - - - - 6 ft. 0 in.
Diameter of pinion - - - - - - 11 in.

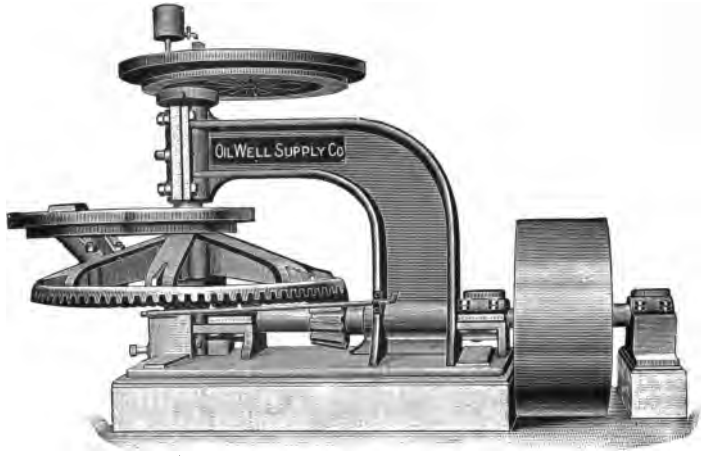
Unsurpassed in strength, because of the large base, with braces of structural steel and strain rods running direct to box on shaft and pivot bearing, where greatest strains come. Can be set on either wood or concrete foundation for less than cost of setting other powers. No braces to interfere with connecting rods running in any desired direction. Holes in top plate of frame for dead-line attachments to hook off lines without going to wells to block up; adjuster screw in step box to adjust bevel gears; self-oiling eccentrics; easily taken apart and transported.

No. 1, complete with one eccentric, $300 00; with two eccentrics, $325 00
No. 2, complete with one eccentric, 280 00; with two eccentrics, 300 00

Shipping weight: No. 1 power, 6,150 lbs.; No. 2 power, 4,600 lbs.

No. 1 "C" PUMPING POWER

Fig. 3336



DESIGNED FOR 12 WELLS OF AVERAGE DEPTH

It is very strong and compact. Can be mounted on timber or cement foundation; vertical shaft 4 inches diameter, with two bearings; horizontal shaft 3¼ inches with three bearings. Adjustable Step Box to provide for constant and perfect alignment. Two Eccentrics or one, as may be desired.

Weight complete, 4650 lbs.

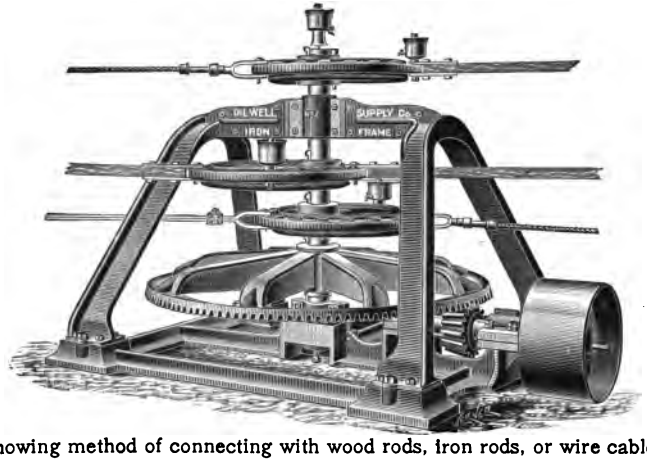
Base measurements, 3 ft. x 4 ft. 6 in.

Power with one Eccentric	$240 00
Power with two Eccentrics	260 00

SURFACE EQUIPMENT FOR PUMPING WELLS

IRON FRAME PUMPING POWER

Figs. 3310 and 3315



Showing method of connecting with wood rods, iron rods, or wire cable.

DIMENSIONS No. 1 POWER

Fig. 3310

Length of bed plate	9 feet 2 inches
Width of bed plate	7 feet 4½ inches
Height of frame	6 feet 10½ inches
Diameter of large gear	7 feet 0 inches
Diameter of pinion	11½ inches
Diameter of main shaft	5 inches
Length of main shaft	5 feet 6 inches
Complete with 2 eccentrics	$400 00
Complete with 3 eccentrics	435 00
Complete with 4 eccentrics	460 00
Shipping weight	**10,000 lbs.**

DIMENSIONS No. 2 POWER

Fig. 3315

Length of bed plate	7 feet 4 inches
Width of bed plate	5 feet 10 inches
Height of frame	4 feet 6 inches
Diameter of large gear	6 feet 0 inches
Diameter of pinion	11 inches
Diameter of shaft	4½ inches
Complete with 1 eccentric	$275 00
Complete with 2 eccentrics	315 00
Complete with 3 eccentrics	340 00
Shipping weight	**6,000 lbs.**

No. 2 IRON FRAME PUMPING POWER

With eccentric below and crank and disc above frame. Made to order only.

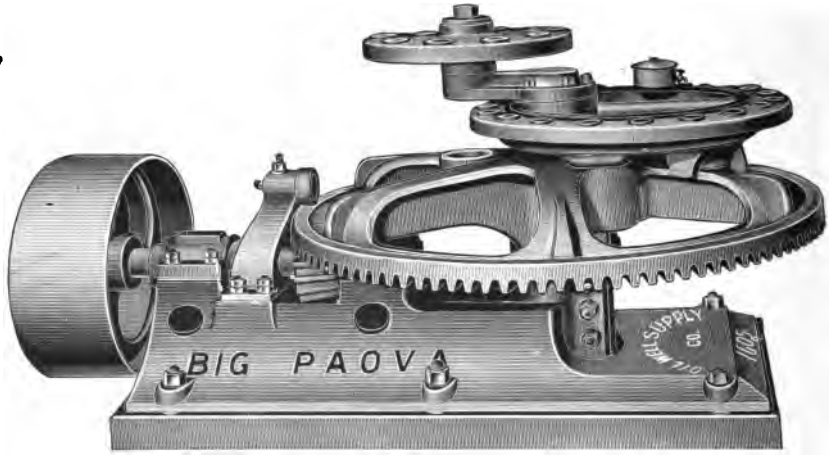
Price of power complete, same as fig. 3315, crank and disc extra	$45 00
Shipping weight	**6,000 lbs.**

SURFACE EQUIPMENT FOR PUMPING WELLS

PAOVA PUMPING POWERS

Paova. Fig. 3343

Big Paova, Fig. 3344



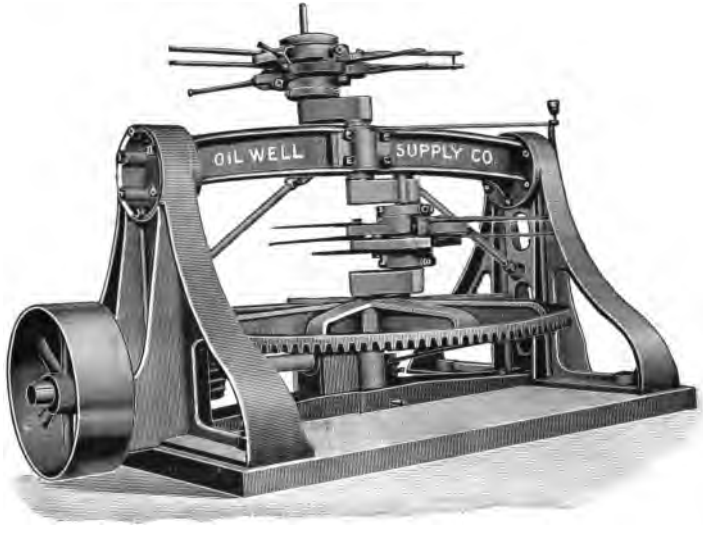
Dimensions, Weight and Price

	Paova	Big Paova 1 Disc	Big Paova Eccentric and Disc
Length of bed plate - - - - - - - - inches	60	70	70
Width of bed plate - - - - - - - - - "	24	30	30
Height of eccentrics - - - - - - - - "	30	31	31-40
Diameter of large gear - - - - - - - "	48	61	61
Diameter of pinion - - - - - - - - - "	8	9½	9½
Diameter of main shaft - - - - - - - "	3½	3½	3½
Weight - - - - - - - - - - - - - - lbs.	**2250**	**3050**	**3500**
Price - - - - - - - - - - - - - - - -	$170 00	230 00	270 00

SURFACE EQUIPMENT FOR PUMPING WELLS

YATES IRON FRAME CRANK SHAFT PUMPING POWER

Fig. 3338



Dimensions	No. 1	No. 2
Length of Frame	9 ft 7 in.	9 ft. 1½ in.
Width of Frame	6 " 0 "	5 " 0 "
Height of Frame from foundation	4 " 8 "	4 " 3½ "
Height of Shaft	6 " 5 "	5 " 11 "
Height of upper flange for rod	6 " 1 "	5 " 7 "
Height of lower flange for rod	3 " 2 "	2 " 10 "
Diameter of master gear	7 " 0 "	5 " 10 "
Diameter of pinion	11 "	8½ "
Diameter of crank shaft	5 "	4½ "
Diameter of pinion shaft	3½ "	3½ "
Weight lbs.	**8600**	**6500**
Price complete	$520 00	410 00

SURFACE EQUIPMENT FOR PUMPING WELLS

THE 20TH CENTURY PUMPING POWER

Is a band wheel power, built low to the ground, having but three working bearings, no babbitt or keys. These bearings rotate constantly in a pool of oil. The main or bottom bearing is fitted with a ball-bearing constructed of case-hardened plates and 1¼-inch tool steel balls.

SINGLE DISC POWER, Fig. 3345

Capacity, 22 Wells. **Weight, 9,500 lbs.** Price - - - **$460 00**

DOUBLE DISC POWER, Fig. 3346

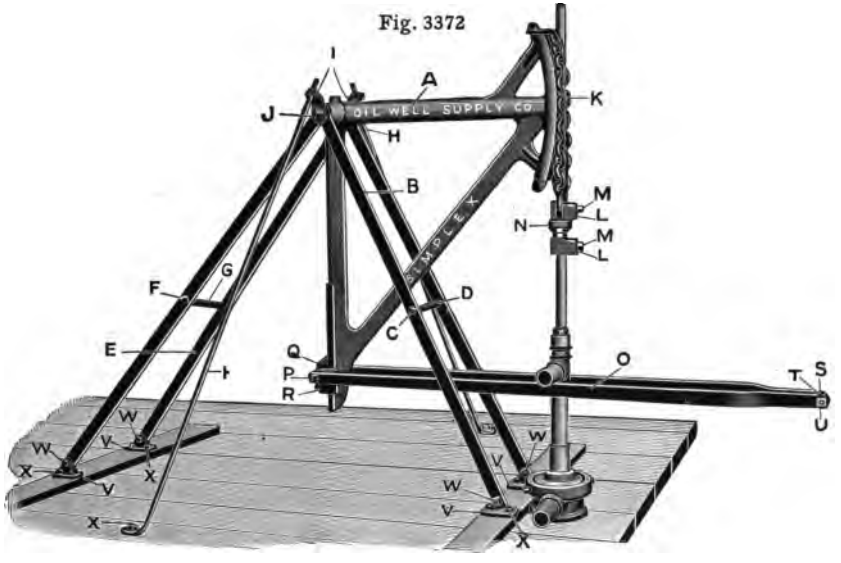
Capacity, 32 Wells. **Weight, 10,000 lbs.** Price - - - **$490 00**

One Gem Belt Tightener is included with each Power.

SURFACE EQUIPMENT FOR PUMPING WELLS

SIMPLEX PUMPING JACK

Fig. 3372



Absolutely a straight-pull jack through entire stroke. No lateral strain on polished rod.

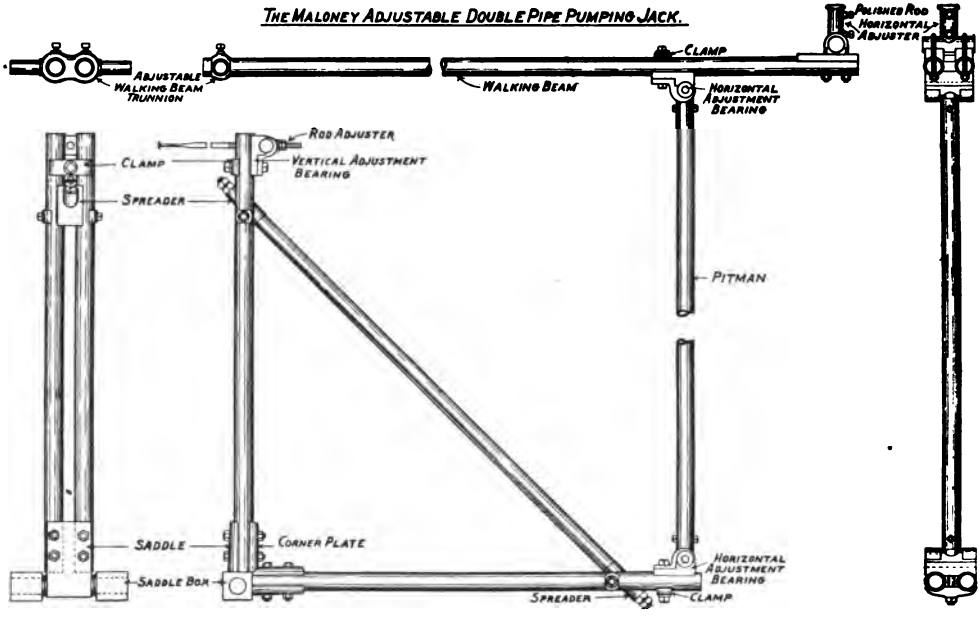
No. 1—Suitable for wells 1,200 feet in depth, **weight, 365 lbs.** - - - - - - - - $15 00
No. 2—Heavy, suitable for wells of any depth, **weight, 495 lbs.** - - - - - - - 25 00

PARTS FOR No. 1		PARTS FOR No. 2	
A—One V or frame - - - - each,	$8 25	A—One V or frame - - - - each,	$10 50
B—Two front braces - - - - each,	1 10	B—Two front braces - - - - each,	1 50
C—One front brace spreader bolt, each,	10	C—One front brace spreader bolt, each,	10
D—One front brace spreader nipple, - - - - - - - - - - - - each,	15	D—One front brace spreader nipple, - - - - - - - - - - - - each,	15
E—Two rear braces - - - - each,	1 25	E—Two rear braces - - - - each,	1 75
F—One rear brace spreader bolt, each,	10	F—One rear brace spreader bolt, each,	15
G—One rear brace spreader nipple, each,	15	G—One rear brace spreader nipple, each,	20
H—Two side braces - - - - each,	30	H—Two side braces - - - - each,	50
I—Two side brace brackets - - each,	10	I—Two side brace brackets - - each,	10
J—One main bearing pin complete, - - - - - - - - - - - - each,	50	J—One main bearing pin complete, - - - - - - - - - - - - each,	1 00
K—One set lift chains complete, per set,	1 50	K—One set lift chains complete, per set,	2 50
L—Two Acme polished rod clamps, each,	25	L—Two Acme polished rod clamps, each,	20
M—Four Acme polished rod clamp bolts - - - - - - - - - each,	10	M—Four Acme polished rod clamp bolts - - - - - - - - - each,	10
N—One polished rod lifting flange, each,	20	N—One polished rod lifting flange, each,	20
O—Two pull straps - - - - each,	75	O—Two pull straps - - - - each,	1 00
P—One pull strap pin - - - - each,	50	P—One pull strap pin - - - - each,	50
Q—One pull strap adjuster - - each,	75	Q—One pull strap adjuster - - each,	75
R—One pull strap adjuster set screw, - - - - - - - - - - - - each,	10	R—One pull strap adjuster set screw, - - - - - - - - - - - - each,	10
S—One pull strap spool - - - each,	10	S—One pull strap spool - - - each,	10
T—One pull strap spool nipple - each,	10	T—One pull strap spool nipple - each,	10
U—One pull strap spool bolt - - each,	10	U—One pull strap spool bolt - - each,	10
V—Four brace castings - - - each,	20	V—Four brace castings - - - each,	50
W—Four brace casting bolts - - each,	05	W—Four brace casting bolts - - each,	05
X—Ten lag screws - - - - - each,	05	X—Eighteen lag screws - - - each,	05

SURFACE EQUIPMENT FOR PUMPING WELLS

MALONEY PUMPING JACK

Fig. 3357



Rear, Side and Front Elevations.

Made of WROUGHT IRON PIPE, doubled in all parts where strength is required, and held in position with castings and machine bolts.

IT IS THE STRONGEST PUMPING JACK MADE

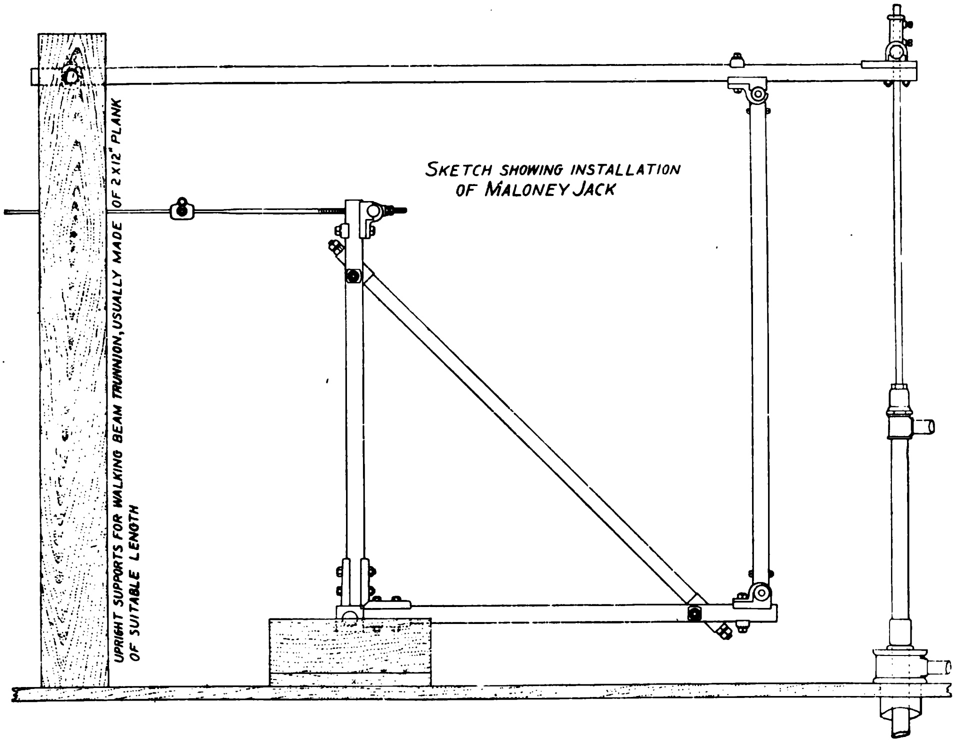
They are so simple in construction that should any part be broken repairs can be made by any lease hand without going to a machine shop. Can be quickly adjusted in either direction, vertically or horizontally, as shown in above illustration.

The expansion and contraction of iron rods is entirely overcome by using the Rod Adjuster or Take-up-screw.

SURFACE EQUIPMENT FOR PUMPING WELLS

MALONEY PUMPING JACK

Fig. 3358



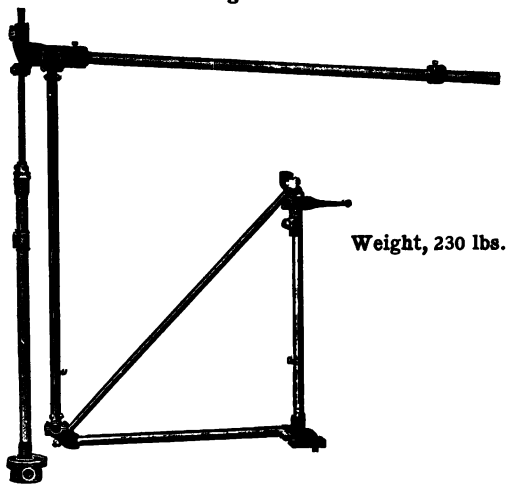
Shipping weight - **440 lbs.**

Price, each - **$15 00**

SURFACE EQUIPMENT FOR PUMPING WELLS

O. K. PUMPING JACK—OVER-PULL

Fig. 3360



Weight, 230 lbs.

O. K. Jack, complete - $15 00

PARTS

V - - - - (1) - - - - - - - -	$11 60	Pitmans - - - - - - (2) - each,	$0 40
Saddle - - (1) - - - - - - - -	1 55	Walking-beam casting - (1) - - -	3 50
Saddle boxes (2) - - - - each,	80	Walking-beam trunnion (1) - - -	60
Top casting - (1) - - - - - - -	1 30	Polished rod collar - - (1) - - -	40
Lift casting - (1) - - - - - - -	1 70	Adjuster - - - - - - (1) - - -	70

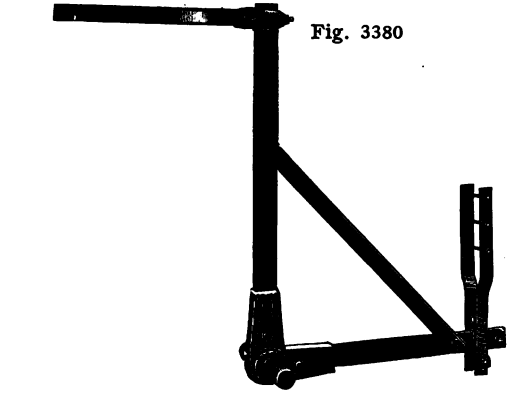


Fig. 3380

PAOVA PUMPING JACK

For wells ranging in depth from 600 to 1,500 feet.

When ordering specify connections, whether for iron rods, wood rods, or wire strand.

Weight, 180 lbs.

Price - - - - - - - - - - - - - $8 00

HUDSON UNDER-PULL PUMPING JACK

Complete for 2-inch tubing - - - **Weight, 355 pounds** - - - - - - - - - - - $15 00

HUDSON OVER-PULL PUMPING JACK

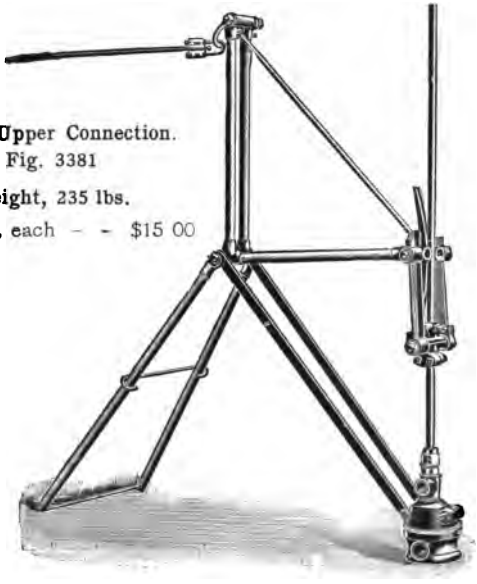
Complete for 2-inch tubing - - - **Weight, 313 pounds** - - - - - - - - - - - $15 00

SWAN PUMPING JACK

Price - $15 00

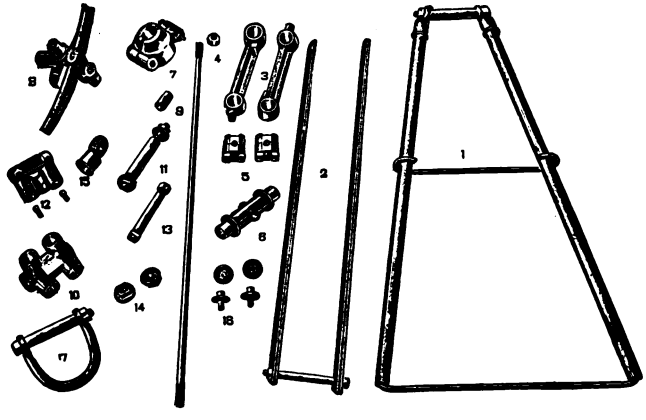
SURFACE EQUIPMENT FOR PUMPING WELLS

JONES & HAMMOND PUMPING JACKS



No. 1 Upper Connection.
Fig. 3381
Weight, 235 lbs.
Complete, each - - $15 00

PARTS. Fig. 3382



No. 1—Back brace, complete - -	$3 00	No. 9—Stay rod nut - - - - -	$0 20
No. 2—Front brace, complete - -	2 00	No. 10—Corner casting - - - -	1 00
No. 3—Side arms - - - - each	75	No. 11—Trunnion pin, complete - -	1 00
No. 4—Stay rod - - - - - - -	75	No. 12—Stirrup box - - - - - -	75
No. 4a—Stay-rod nut - - - - - -	15	No. 13—Bolt and sleeve for stirrup -	25
No. 5—Polish rod clamps - - each	30	No. 14—Nuts for trunnion pin, each	15
No. 6—Adjuster bar - - - - -	1 00	No. 15—Pipe socket for back brace -	20
No. 7—Tubing clamp - - - - -	1 50	No. 16—Side-arm nuts - - - each	15
No. 8—Arc - - - - - - - - -	2 50	No. 17—Stirrup - - - - - - - -	60

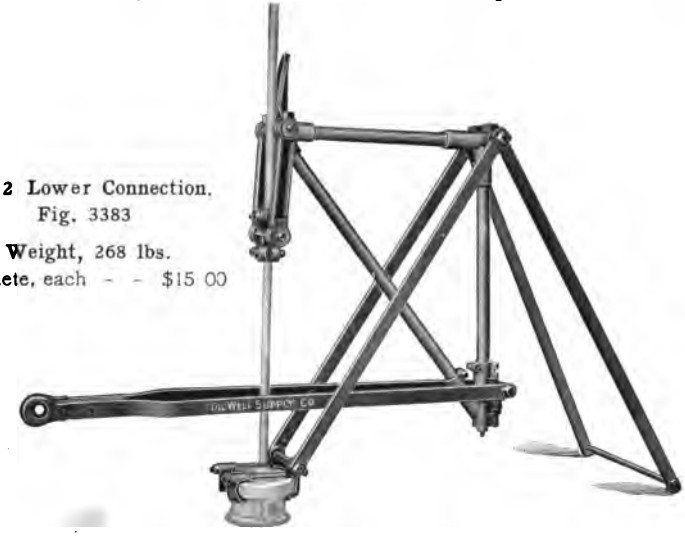
No. 3 Jones & Hammond Pumping Jack, extra heavy, for 2½ and 3-inch tubing, each $25 00
Weight, 450 lbs.

SURFACE EQUIPMENT FOR PUMPING WELLS

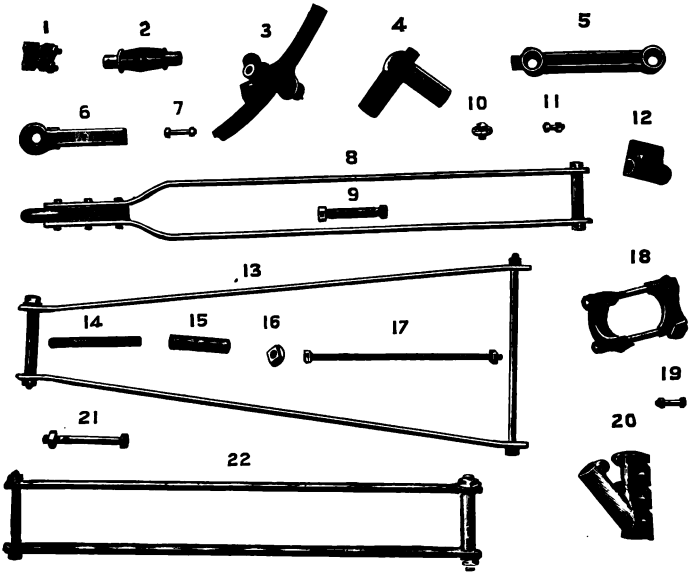
JONES & HAMMOND PUMPING JACKS

No. 2 Lower Connection.
Fig. 3383

Weight, 268 lbs.
Complete, each - - $15 00



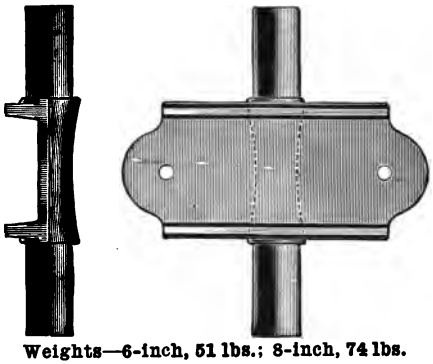
PARTS. Fig. 3384



No. 1	—Polished rod clamps, each	$0 30
No. 2	—Adjuster bar	1 00
No. 3	—Arc	2 50
No. 4	—Corner casting	1 25
No. 5	—Side arms, each	75
No. 6	—Pull rod connection	50
No. 7	—Bolts for pull rod connection, each	05
No. 8	—Long stirrup side irons	2 00
No. 9	—Bolt and sleeve for long stirrup	30
No. 10	—Side arm nuts, each	15
No. 11	—Bolts for stirrup box, each	05
No. 12	—Stirrup box	60
No. 13	—Back braces	$2 50
No. 14	—Bolt for trunnion pin	25
No. 15	—Sleeve for trunnion pin	25
No. 16	—Nuts for trunnion pin, each	15
No. 17	—⅞x24" bolt for rear brace	30
No. 18	—Casing head clamp castings	1 00
No. 18A	—" " " bolts, each	15
No. 19	—Bolts for V castings, each	05
No. 20	—V casting	1 50
No. 21	—Bolt for front brace	15
No. 22	—Front braces	2 00

SURFACE EQUIPMENT FOR PUMPING WELLS

V SADDLE—Fig. 3500



Weights—6-inch, 51 lbs.; 8-inch, 74 lbs.

90° SADDLE—Fig. 3505

Ajax pattern
Weight, 51 lbs.

SADDLE BOX
Fig. 3501

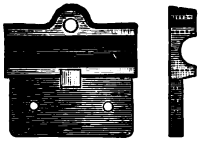
Weight, 7 lbs.

MALONEY SADDLE BOX
Fig. 3501-A

Weight, 10 lbs.

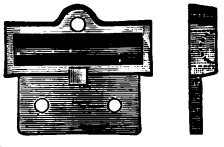
Size - - - - - - - - - - inches	6	8	6 Half	6 Ohio	6 Harmony	8 Harmony
V saddles, fig. 3500 - - - - - - - -	$4 30	5 40	3 60	3 40	5 50	6 50
V saddle boxes, fig. 3501 - - - - - - -	50	50	- - -	50	75	- - -
Maloney saddle boxes, fig. 3501-A - - -	90	90	- - -	- - -	- - -	- - -
90° saddles, fig. 3505 - - - - - - - -	4 75	- - -	- - -	- - -	6 50	- - -

OPEN STIRRUP BOX
Fig. 3502



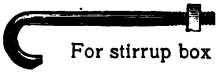
Weights—4-inch, 5 lbs.; 6-inch, 7 lbs.; 8-inch, 17 lbs.; 10-inch, 22 lbs.

CLOSED STIRRUP BOX
Fig. 3503



Weights—4-inch, 7 lbs.; 6-inch, 9 lbs.; 8-inch, 19 lbs.; 10-inch, 24 lbs.

HOOK BOLT
Fig. 3504



For stirrup box

STIRRUP BOXES—Figs. 3502-3503

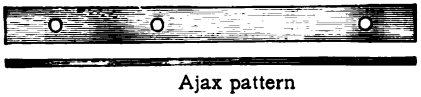
When ordering, state whether wanted for stirrups made of flat or round iron

Size stirrup for - - - - - - inches		4	4	6	6	6	6	8	8	8	8	10
Open ends	Size bearing - - - inches	1¼	1½	1¼ Light	1¼, 1½ Regular	1¾	2	1¼	1½	1¾	2	1¼
	Price each - - - - - - - -	- - -	$0 35	40	45	55	80	80	- -	1 00	1 05	1 00
	With lug - - - - - - - - -	- - -	- - -	55	60	- -	90	- - -	80	- - -	1 20	- - -
Closed ends	For round iron stirrups - - -	- - -	75	80	95	- -	- -	1 00	- -	- - -	- - -	- - -
	For flat iron stirrups - - - -	- - -	60	- - -	80	85	- -	- - -	- -	- - -	- - -	- - -
	For flat iron stirrups with lug -	$0 55	60	- -	85	- -	- -	- - -	- -	- - -	- - -	- - -

HOOK BOLTS—Fig. 3504

Size - - - - - - - - - - - - inches	⅝ x 8	⅝ x 12	¾ x 8	¾ x 10	¾ x 13	1¼ x 10
Price - - - - - - - - - - - - - -	$0 30	40	35	45	50	80

EQUALIZER STRAP—Fig. 3571



Ajax pattern

Equalizer straps, O. W. S. Co., no bolts, fig. 3571 - - - - - - - - per set (2) $1 00
Equalizer straps, St. Mary's pattern, per set (2) 4 00

Weight, per set (2), 17 lbs.

SURFACE EQUIPMENT FOR PUMPING WELLS

SWING POST CASTINGS
Fig. 3506

Ajax pattern
Weight per set, 78 pounds.
Per set (2) - - - - $6 50
Boxes and bolts, complete - - - each, 1 75
Side arms - each, 1 50

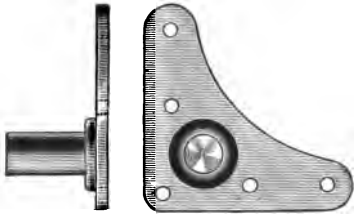
SAGE ROCKER
Fig. 3498

Weight, 50 pounds.
Price, 6-inch - - - - - $4 50

SAGE ROCKER BOX

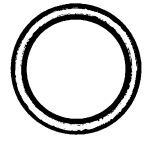
Weight, 5 Pounds
Price - - - - $0 60

L GUDGEON
Fig. 3507



Weight, 27 pounds.
L gudgeons, fig. 3507 - - - - per set, $4 00
L gudgeons, fig. 3507, with bolts, per set, 4 50

ROUND IRON RING
Fig. 3559

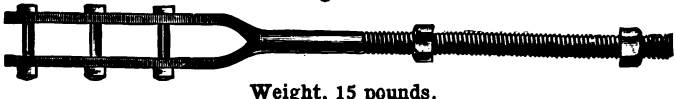


Diameter iron, inches	1	1⅛	1¼	1½
Price - - - - - - -	$1 00	1 25	1 25	2 00

LINK CONNECTION
Fig. 3430

Size iron in straps - - - - - inches	2½ x ⅝	3 x ¾	4 x ¾
Size iron in links - - - - - inches	1⅛	1¼	1½
Weight per set - - - - - - - lbs.	160	275	375
Per set (2) - - - - - - - - - -	$15 00	21 75	32 80

STRAIN BOLT FOR WOOD CONNECTING RODS
Fig. 3577

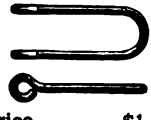


Weight, 15 pounds.
Price - $3 50

CLEVIS FOR POWER
Fig. 3566

Ajax pattern
Weight, 8 pounds.
Price - - - $2 25

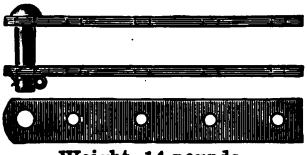
SWING CLEVIS FOR WOOD RODS
Fig. 3575



Price - - - $1 00

SURFACE EQUIPMENT FOR PUMPING WELLS

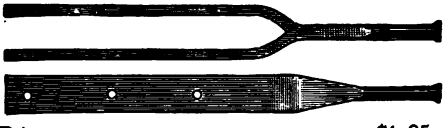
STRAPS FOR CONNECTING WOODEN RODS TO ECCENTRIC POWER OR O. K. PUMPING JACK—Fig. 3561



Weight, 14 pounds.

Price - - - - - - - - - - - - - $1 65

CONNECTION FROM WOOD TO IRON RODS—Fig. 3574

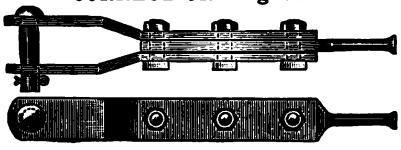


Price - - - - - - - - - - - - - $1 85

YOKE FOR CONNECTING WIRE ROPE TO O. K. PUMPING JACK—Fig. 3563

Weight, 12 pounds.

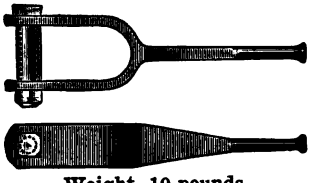
ECCENTRIC STRAP AND IRON ROD CONNECTION—Fig. 3565



Weight, 20 pounds.

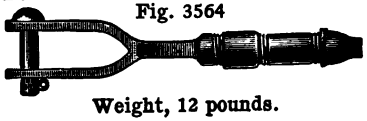
Price - - - - - - - - - - - - - $2 85

YOKE FOR CONNECTING IRON RODS TO O. K. PUMPING JACK—Fig. 3562



Weight, 10 pounds.

YOKE FOR CONNECTING WIRE ROPE TO ECCENTRIC PUMPING POWER Fig. 3564



Weight, 12 pounds.

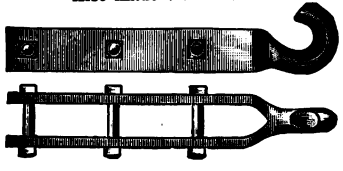
Yokes, fig. 3562 - - - - - - - - - size, inches	$\frac{5}{8}$ and $\frac{9}{16}$	$\frac{3}{4}$ and $\frac{9}{16}$	$\frac{7}{8}$	1
Price - - - - - - - - - - - - - - - - - -	$1 75	1 75	2 35	2 50

Yokes, figs. 3563, 3564; size pipe thread - inches	1	$1\frac{1}{4}$	$1\frac{1}{2}$	Pins
Price - - - - - - - - - - - - - - - - - -	$2 70	2 70	2 70	25

LIST

$\frac{1}{4}$x2x18" Hook, $2 80
" Clevis, 2 50
$\frac{1}{4}$x2x18" Hook, 3 35
" Clevis, 3 00
$\frac{3}{4}$x2$\frac{1}{2}$x18" Hook, 4 75
" Clevis, 3 60

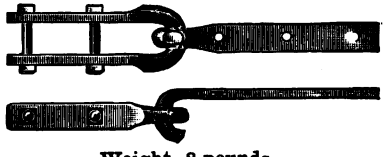
D, STIRRUP HOOK—Fig. 3569
Also made with Clevis



Weight, 10 pounds.

Price - - - - - - - - - - - - - $2 85

DISCONNECTING CLEVIS AND HOOK Fig. 3570



Weight, 8 pounds.

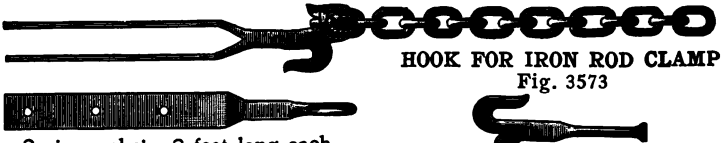
Price - - - - - - - - - - - - - $3 00

DISCONNECTING HOOK Fig. 3568

Weight, 6 pounds.

Price - - $3 00

STRAP WITH DOUBLE HOOK AND CHAINS FOR CONNECTION FROM WOOD TO IRON RODS—Fig. 3572

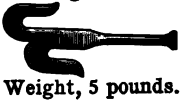


2 pieces chain, 2 feet long each.

Weight, 31 pounds.

Price - - - - - - - - $3 75

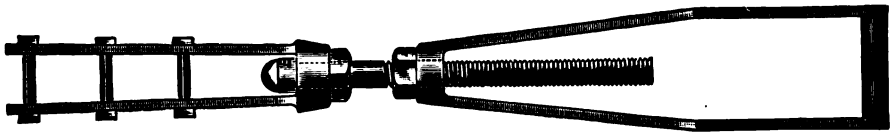
HOOK FOR IRON ROD CLAMP Fig. 3573



Weight, 5 pounds.

Price - - - - - - - - $1 40

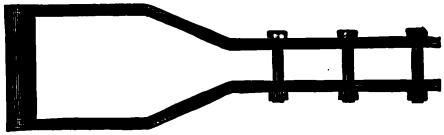
SURFACE EQUIPMENT FOR PUMPING WELLS



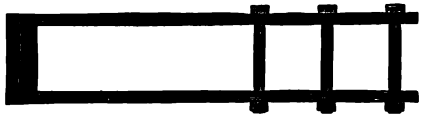
SWIVEL STIRRUP—Fig. 3537

Swivel stirrups, fig. 3537; size - inches	6	6	8	8	8	10	12
Size of screw - - - - - - - - inches	1¼	1½	1¼	1½	1¾	1¾	2
Weight - - - - - - - - - - - **lbs.**	**62**	**64**	**70**	**72**	**74**	**80**	**84**
Price - - - - - - - - - - - - - -	$12 00	13 50	16 75	23 00	26 75	28 25	39 00

STIRRUP FOR WOOD RODS—Fig. 3521



STRAIGHT STIRRUP—Fig. 3525



ROUND IRON STIRRUP—Fig. 3532

SIDE STIRRUP—Fig. 3522

Made in all forms and sizes as flat iron stirrups shown.

REGULAR STIRRUPS FOR WOOD RODS

Size.....inches	4x2	4x4	6x2	6x4	6x6	8x2	8x4	10x2	10x4
Flat iron, figs. 3521 to 3525, size iron 1½x½	$1 75	1 75	2 00	2 00	2 00	2 25	2 25	3 00	3 00
Heavy stirrups, size iron 2x⅝	....	....	3 00	3 00	3 00	4 00	4 00	5 00	5 00
Ex. hy. stirrups, size iron 2x¾	....	....	4 00	4 00	4 00	5 00	5 00	6 00	6 00
Double extra heavy stirrups, size iron 2½x¾	....	....	5 50	5 50	5 50	6 50	6 50	7 50	7 50
Round iron, fig. 3532, size 1¼	2 25	2 25	2 50	2 50	2 50	2 75	2 75	....	....
Round iron, fig. 3532, size 1½	....	....	3 25	3 25	3 25	4 25	4 25	....	....
Round iron, fig. 3532, size 1¾	....	....	....	....	....	....	....	7 00	7 00

APPROXIMATE WEIGHT OF STIRRUPS, LBS.

Size - - - - - inches	4	6	8	10
Made 1½ x ½-inch iron - -	14	15	16	18
Made 2 x ⅝-inch iron - -	23	25	27	29
Made 2 x ¾-inch iron - -	28	30	32	34
Made 2½ x ¾ inch iron - -	32	34	36	38
Made 1¼-inch round iron -	23	25	27	29
Made 1½-inch round iron -	33	35	37	39
Made 1¾-inch round iron -	45	47	49	51

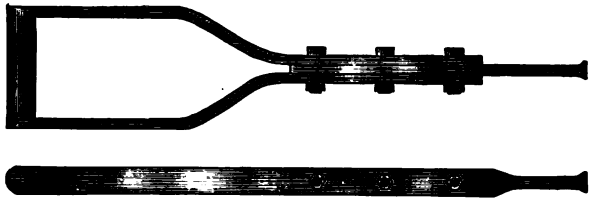
C, OR DISCONNECTING LINK

Fig. 3567

Size, inches	⅞	1	1⅛	1¼	1½
Weight, lbs.	**5**	**7**	**9**	**11**	**14**
Price - -	$0 45	50	60	75	1 15

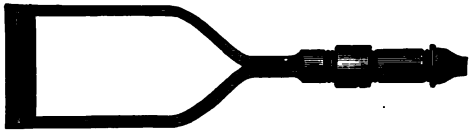
SURFACE EQUIPMENT FOR PUMPING WELLS

STIRRUP WITH IRON ROD CONNECTION—Fig. 3529



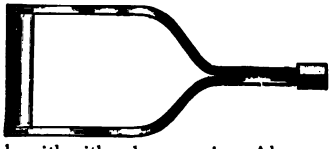
Also made of round iron

STIRRUP FOR CONNECTING TO WIRE ROPE Fig. 3531



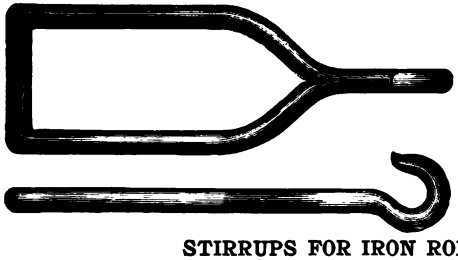
Also made of round iron and with center piece connection for wire rope

STIRRUP FOR CONNECTING TO SUCKER RODS—Fig. 3536

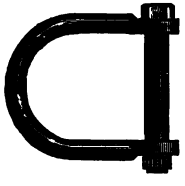


Made with either box or pin. Also made of round iron and with box or pin center piece

HOOK STIRRUP—Fig. 3535



STIRRUP—Fig. 3528



Ajax pattern

STIRRUPS FOR IRON RODS AND WIRE ROPE

Size stirrup - - - - - - - - - - - - - - - - - - inches	4	6	8	10
Flat iron, with center piece, fig. 3529 - - size iron 1½ x ½ inches	$1 75	2 00	2 50	3 60
Flat iron, with center piece, fig. 3529 - - size iron 2 x ⅝ inches	----	2 75	3 25	4 15
Flat iron, with center piece, fig. 3529 - - size iron 2 x ¾ inches	----	3 50	4 50	5 90
Flat iron, with center piece, fig. 3529 - - size iron 2½ x ¾ inches	----	5 00	6 25	7 65
Round iron, with center piece, not illustrated, size iron 1¼ inches	2 25	2 50	----	6 50
Round iron, with center piece, not illustrated, size iron 1½ inches	2 75	5 50	6 50	7 00
Round iron, with center piece, not illustrated, size iron 1¾ inches	----	----	----	7 75
For connecting to wire rope, iron or wood sucker rods, or with 1¼-inch pipe thread, made of ½ x 1½ inch flat iron or 1¼-inch round iron, figs. 3531, 3536 - - - - - - - - - - - -	2 00	2 75	3 25	4 00
Ajax stirrups, fig. 3528 - - - - - - - - - - - - - -	2 00	2 50	3 00	3 50
Ajax stirrups, fig. 3528 - - - - - - - - - weight, lbs.	**10**	**12**	**13**	**15**

Hook stirrups, 1¼-inch round iron, fig. 3535, **weight 17 lbs.** - - - - - - - - - - $3 50

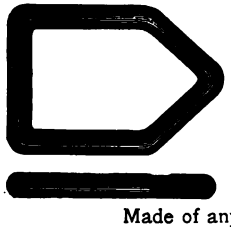
STIRRUP CENTER PIECES ONLY

Size rod for - - - - - - - - - - - - - - - - - - inches	⅝	⅞	¾	⅞
Weight - lbs.	**3**	**3**	**4**	**6**
As shown with fig. 3529 - - - - - - - - - - - - - - - -	$0 50	50	50	50
For Ajax rods, see fig. 3604, page 259 - - - - - - - - -	----	70	70	70

For approximate weight of stirrups, see page 254.
The foregoing lists on stirrups include the bolts.

SURFACE EQUIPMENT FOR PUMPING WELLS

SHORT D STIRRUP
Fig. 3526



LONG D STIRRUP
Fig. 3527

Made of any size, round iron desired

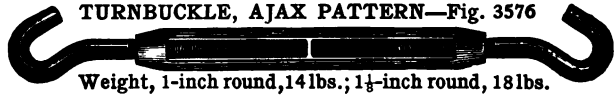
COMBINATION CLAMP CONNECTION
Fig. 3560

Weight, 5 to 8 lbs., each

D stirrups, figs. 3526, 3527; size, inches	6 x 8	6x10	6x12	6x8	6x10	6x12	6x10	6x12	8x12	6x10	6x12
Size of iron - - - - - - inches	1	1	1	1⅛	1⅛	1⅛	1¼	1¼	1¼	1½	1½
Weight - - - - - - - - - **lbs.**	**8**	**9**	**10**	**9**	**10**	**11**	**11**	**13**	**15**	**20**	**22**
Price - - - - - - - - - - - -	$1 15	1 20	1 50	1 30	1 45	1 85	1 70	2 00	2 25	1 85	2 15

Combination clamps, fig. 3560; size, inches	½	9/16	⅝	¾	½	9/16	⅝	¾	9-inch loops only	16-inch loops only
Length - - - - - - - - - - inches	9	9	9	9	16	16	16	16		
Price - - - - - - - - - - - -	$0 70	85	85	1 00	80	95	95	1 10	35	45

TURNBUCKLE, AJAX PATTERN—Fig. 3576



Weight, 1-inch round, 14 lbs.; 1⅛-inch round, 18 lbs.

TURNBUCKLE WITH STUB ENDS—Fig. 3538

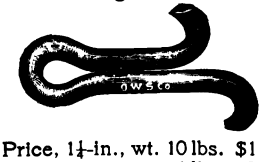
Size - - - - - - - - - inches	½	¾	1	1¼
Turnbuckles, fig. 3576 - - - - - -	$1 85	3 00	4 50	5 00
Turnbuckles, with stub ends, fig. 3538	----	2 25	3 75	4 25

THROW-OFF HOOKS

VENEDOCIA STYLE
Fig. 3547

Weight, 3.3 lbs.
Price - - - - - - $2 00

PRAIRIE DEPOT STYLE
Fig. 3548



Price, 1¼-in., wt. 10 lbs. $1 50
Price, 1½-in , wt. 16 lbs. 3 00

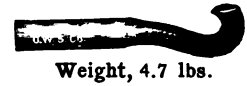
1¼-INCH DOUBLE PIPE, GENEVA STYLE
Fig. 3549

Weight, 6.2 lbs.
Price - - - - - $3 75

FINDLAY STYLE
Fig. 3551

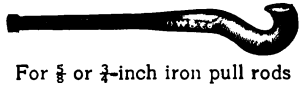
Weight, 2 lbs.
Price, set - - - - $1 20

1¼-INCH SINGLE PIPE, GENEVA STYLE—Fig. 3550



Weight, 4.7 lbs.
Price - - - - - - - - - - - - - - - - - - $2 75

DISCONNECTING HOOK—Fig. 3545



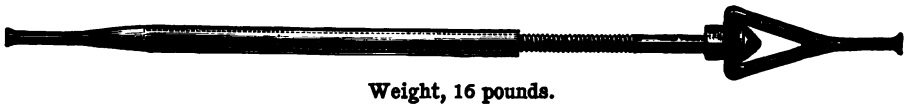
For ⅝ or ¾-inch iron pull rods
Weight, 2.5 lbs.
Price - - - - - - - - - - - $2 00

DISCONNECTING STIRRUP—Fig. 3546

For ⅝ or ¾-inch iron pull rods
Weight, 2.5 lbs.
Price - - - - - - - - - - - $3 00

SURFACE EQUIPMENT FOR PUMPING WELLS

TAKE-UP SCREW FOR IRON RODS—Fig. 3578



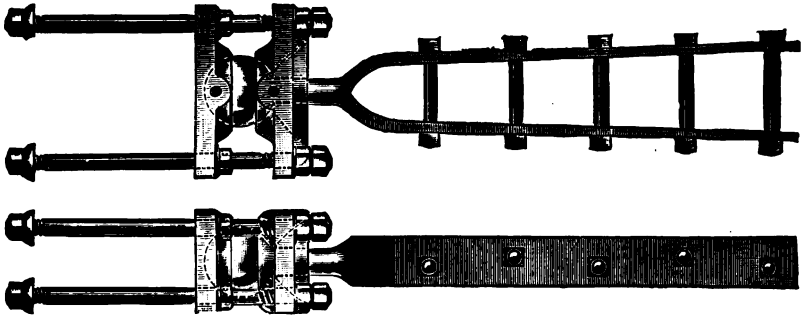
Weight, 16 pounds.

TAKE-UP SCREW FOR WIRE ROPE—Fig. 3579

Weight, 18 pounds.

Take-up screws for iron rods, fig. 3578, size rod - - - inches	5/8	3/4	7/8	1
Price	$10 25	10 25	14 00	14 00
Take-up screws for wire rope, fig. 3579, size rope - - - inches	**5/8**	**3/4**	**7/8**	**1**
Price	$13 75	13 75	18 25	18 25

BALL JOINT—Fig. 3580



Ball joints, fig. 3580, size - - - - - - - - - - inches	4	5	6
Weight each - - - - - - - - - - - - - - - - lbs.	**96**	**159**	**300**
Price	$19 75	28 50	46 00

PIPE EYE—Fig. 3613

Made in all sizes

WIRE ROPE CLIP—Fig. 3614

Made in all sizes

COLLAR FOR PIPE SWING POST—Fig. 3612

Price, 2 inch - - $0 35

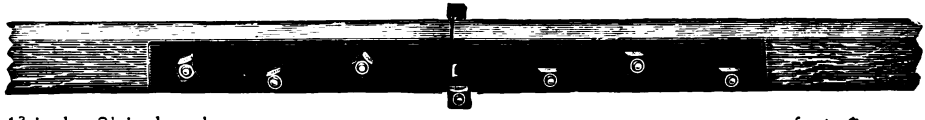
Pipe eyes or hooks, size - - - - - - - - - - inches	1 x 12	1¼ x 12	1½ x 12
Eyes, fig. 3613 - - - - - - - - - - - - - - - -	$1 10	1 15	1 30
Hooks (not illustrated) - - - - - - - - - - - - - -	1 00	1 10	1 20

Wire rope clips, size rope for - inches	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1⅛	1¼	1⅜	1½
Price - - - - - - - - - - - -	$0 25	25	25	30	35	40	45	50	60	65	70	75

SURFACE EQUIPMENT FOR PUMPING WELLS

WOOD CONNECTING RODS AND STRAPS

Fig 3400.



1¾-inch x 2½-inch rods - per foot, $----
2 -inch x 3 -inch rods - per foot, ----

These rods are used to connect wells so they can be pumped by one engine. Many wells may be coupled together, though thousands of feet apart. The rods are of ash, from 20 to 25 feet long, and are united by straps fastened to the rods by bolts and nuts.

2-INCH X 1 3/16-INCH X 30-INCH CONNECTING ROD STRAP

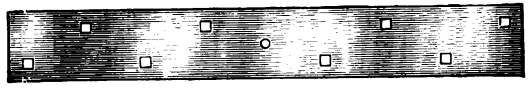
Fig. 3632

2-INCH X 1 3/16-INCH X 30-INCH CONNECTING ROD STRAP

Fig 3634.

4-INCH X ¼-INCH X 30 INCH CONNECTING ROD STRAP

Fig. 3638



CONNECTING ROD STRAPS

Made with either round or square holes

Width - - - - inches	1½	2	2	2	2	2	2½	2½	2½
Thickness - - - inches	3/16	3/16	3/16	¼	¼	⅜	3/16	3/16	¼
Length - - - - inches	22	24	30	24	30	24	28	30	30
Weight per set - - lbs.	-----	**6**	**7**	--	**10**	**12**	**10**	**11**	**12**
Per set of two - - - - -	$0 33	43	50	60	63	1 00	63	75	80

Width - - - - inches	2½	3	3	4	4	5	5	5	5
Thickness - - - inches	¼	3/16	¼	¼	¼	¼	¼	¼	¼
Length - - - - inches	36	30	30	30	36	30	36	42	48
Weight per set - - lbs.	**14**	**12**	**14**	**18**	**22**	**24**	**27**	**31**	**36**
Per set of two - - - - -	$0 95	1 00	1 05	1 25	1 45	1 75	2 00	2 25	2 45

SPECIAL GALVANIZED PUMPING STAND

Fig. 3401

Used for same purpose as wood connecting rods

Diameter - - - - - - inches	5/16	⅜	½	9/16	⅝	¾	⅞	1
Seven wires - - - per 100 feet	$2 55	3 20	5 20	6 60	8 50	12 00	17 00	21 50
Weight per 100 feet - - - lbs.	**22**	**30**	**52**	----	----	----	-----	-----

SURFACE EQUIPMENT FOR PUMPING WELLS

REGULAR IRON CONNECTING OR PULL ROD—Fig. 3603

AJAX IRON CONNECTING OR PULL ROD—Fig. 3604

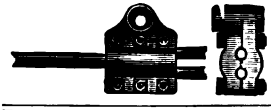
ONE-BOLT ROD CLAMP—Fig. 3607

IRON ROD CLAMP—Fig. 3600

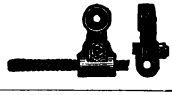
DOUBLE IRON ROD CLAMP—Fig. 3601

IRON ROD CLAMP—Fig. 3602

IRON ROD, ¾ x ⅝ INCH BRANCH CLAMP Fig. 3605



K. C. CLAMP FOR SUSPENDING WIRE ROPE Fig. 3610



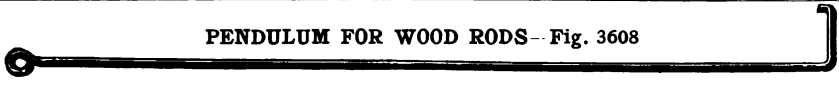
CLAMP FOR CARRYING IRON RODS OR WIRE ROPE—Fig. 3611

Size - - - - - - - - - - - - - - - - - - inches	9/16	5/8	11/16	3/4	7/8	1
Pull or surface rods, complete, regular, fig. 3603, - - -	----	---	---	---	---	---
Pull or surface rods, complete, Ajax, fig. 3604 - - - -	----	---	---	---	---	---
Pull or surface rods, with 1 bolt clamp, fig. 3607, - -	---	---	---	---	---	---
Weight of connecting rods per 100 ft., including clamps, lbs.	90	110	135	155	215	280

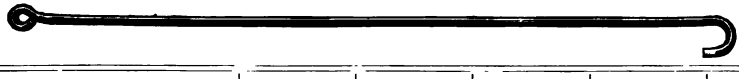
PRICES ON APPLICATION

Size iron rod and carrying clamps, inches	3/8	1/2	9/16	5/8	11/16	3/4	7/8	1
Fig. 3600, heavy, 4 bolt - - - - - - - -	----	---	--	$0 70	75	80	90	----
Fig. 3601, double, 4 bolt - - - - - - - -	- -	$0 60	60	65	70	70	----	----
Fig. 3601, XX heavy, 6 bolt - - - - - -	----	----	--	--	--	1 40	----	----
Fig. 3602, heavy, 4 bolt - - - - - - - -	----	70	70	70	75	80	1 00	1 00
Fig. 3602, light, 4 bolt - - - - - - - -	----	----	--	60	65	70	----	----
Fig. 3605, branch, 4 bolt - - - - - - - -	----	----	--	80	85	85	----	----
Fig. 3605, XX heavy, 6 bolt - - - - - -	----	----	--	--	--	1 40	----	----
Fig. 3607, 1 bolt, malleable iron - - - -	----	----	45	45	65	65	----	----
Fig. 3607, 1 bolt, cast iron - - - - - -	----	----	40	40	50	50	----	----
Fig. 3610, K. C. - - - - - - - - - -	$0 22	22	22	25	25	25	----	----
Fig. 3611, Wait's - - - - - - - - - -	- -	18	18	22	22	22	25	- -

PENDULUM FOR WOOD RODS—Fig. 3608



PENDULUM FOR WIRE ROPE—Fig. 3609



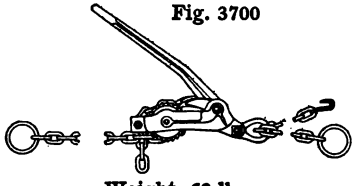
Pendulums, figs. 3608, 3609, size	3/8 in. x 3 ft.	3/8 in. x 3½ ft.	7/16 in. x 3½ ft.	½ in. x 3½ ft.	9/16 in. x 3½ ft.
Price - - - - - - - - - -	$0 25	30	40	50	60

SURFACE EQUIPMENT FOR PUMPING WELLS

LARGE STRETCHER JACK

USED FOR ADJUSTING AND TIGHTENING LINES OF PULL RODS

Fig. 3700



Weight, 63 lbs.

Complete	$7 00
Jack only	3 00
Long chain only	2 50
Short chain only	1 50

PARTS

Wheel	$0 75
Sides (2)	each 55
Dogs (2)	each 25
Lever, complete	70
Chain lifter	15

MICHIGAN PUMPING OUTFIT

ADJUSTER
Fig. 3301

CONNECTING JOINT
Fig. 3303

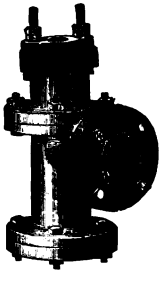
POLISHED ROD
Fig. 3304

ADJUSTER BOX
Fig. 3302

SUBSTITUTE
Fig. 3306

VALVE ROD
Fig. 3305

STUFFING BOX
Fig. 3307



PARTS	Figure No.	Weight, lbs.	Price
Adjuster	3301	130	$46 00
Connecting joint	3303	15	26 00
Polished rod	3304	170	16 50
Adjuster boxes per set	3302	60	9 00
Stuffing box	3307	218	19 50
Substitute	3306	18	4 00
Valve rod	3305	30	4 75
Weight, complete lbs.	----	641	-----

HOFFMAN PUMPING HEAD

FOR PUMPING WITH COMPRESSED AIR

Patented Oct. 25, 1904. Other patents applied for

Fig. 3354

PRICE

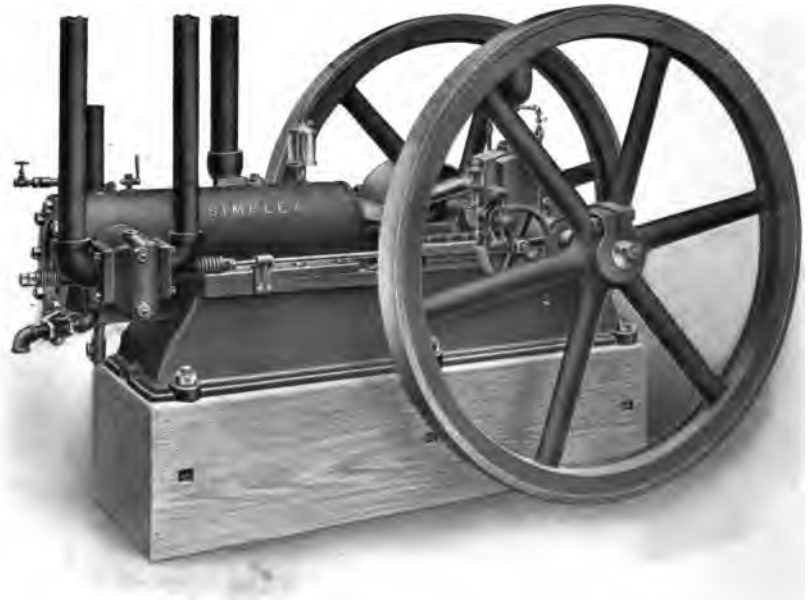
8	inches	diameter,	30	inches	long,	each	$65 00
9	"	"	30	"	"	"	70 00
10	"	"	30	"	"	"	75 00
10	"	"	36	"	"	"	80 00

GAS ENGINES

Gas engines are used extensively for pumping single wells or groups of wells connected to a central power.

A gas engine will do the work for which it is designed more economically and conveniently than a steam engine, but, from its different nature, cannot be overloaded to the extent that a steam engine may, which fact must be taken into account when ordering.

Fig. 1475



The Simplex Gas Engine is a four cycle engine for general power purposes.

HORSE-POWER AND DIMENSIONS

Horse-power, rated	10	15	20	25	35	50
Horse-power, actual	12	18	22½	27½	38	55
Cylinder, diameter - inches	8	10	10	12	13	14
Cylinder, stroke - "	14	15	17	20	20	24
Pulley, diameter - "	16	16	16	20	20	36
Pulley, face - - - "	10	10	10	12	12	12
Weight, complete - - lbs.	**3,850**	**4,850**	**5,000**	**6,000**	**8,200**	**11,800**
Revolutions per minute	175	170	170	165	165	150
PIPING:						
Gas inlet - - - inches	1	1	1	1	1¼	1¼
Igniter - - - - "	¼	¼	¼	¼	¼	⅜
Water - - - - - "	1	1	1	1	1	1
Air - - - - - - "	2½ / 8 thd.	2½ / 8 thd.	2½ / 8 thd.	3¼ / 11½ thd.	4 / 8 thd.	4 / 8 thd.
Exhaust, diameter "	3 / 11½ thd.	3 / 11½ thd.	3 / 11½ thd.	4 / 8 thd.	4 / 8 thd.	5 / 8 thd.
Exhaust, length - feet	5 / 3	5 / 3	5 / 3	5 / 5	5 / 5	- - - - / - - - -
Price	$410 00	450 00	480 00	570 00	710 00	1100 00

Horse power consumption, about 12 cubic feet of natural gas per hour.

O. W. S. DRILLING GAS ENGINE

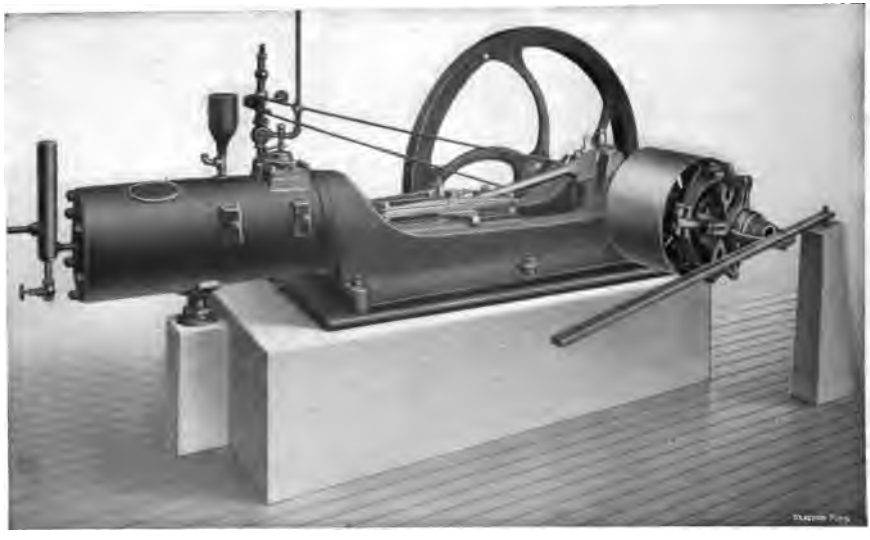
Fig. 1460

The O. W. S. Drilling Gas Engine is a two cycle crosshead type, heavy duty engine, built expressly for well drilling. 25 Horse Power. **Weight, 7,600 lbs.**

Price. including Reversing Clutch - $850.00

BRADFORD GAS ENGINE

Fig. 1495



The Bradford Gas Engine is a two cycle crosshead type engine built on the standard oil country steam engine bed and combines durability with low cost.

Horse-Power	Cylinder	Weight, lbs.	Price
10	7½ x 12″	3200	$345 00
15	9 x 12″	4000	375 00

Extra when two fly wheels are furnished - - - - - - - - - - - - - - - - $30 00

CONVERTED ENGINE

To convert a steam engine to a gas engine, the steam cylinder is replaced by a gas cylinder and a clutch pulley takes the place of the regular belt pulley.

PARTS. Fig. 1496

CYLINDER AND PARTS COMPLETE

7½ x 12″, 10 Horse-power	Price	$185 00
9 x 12″, 15 "	"	195 00

HARD VULCANIZED FIBER

RED

For lining up engine slides, friction pulleys, friction washers, etc.

In sheets 42 x 70 inches.

Under $\frac{1}{32}$-inch thick	per pound $0 70	From ¼ to 1-inch	per pound $0 60
From $\frac{1}{32}$ to $\frac{1}{16}$-inch	" 60	1 inch and thicker	" 65
From $\frac{1}{16}$ to ½-inch	" 50		

REVERSING CLUTCH

Fig. 1467

The Reversing Clutch is built to suit any of our Gas Engines and enables the operator to reverse the motion of the belt at will. It is generally used for drilling or cleaning out wells.

GASOLINE ATTACHMENTS

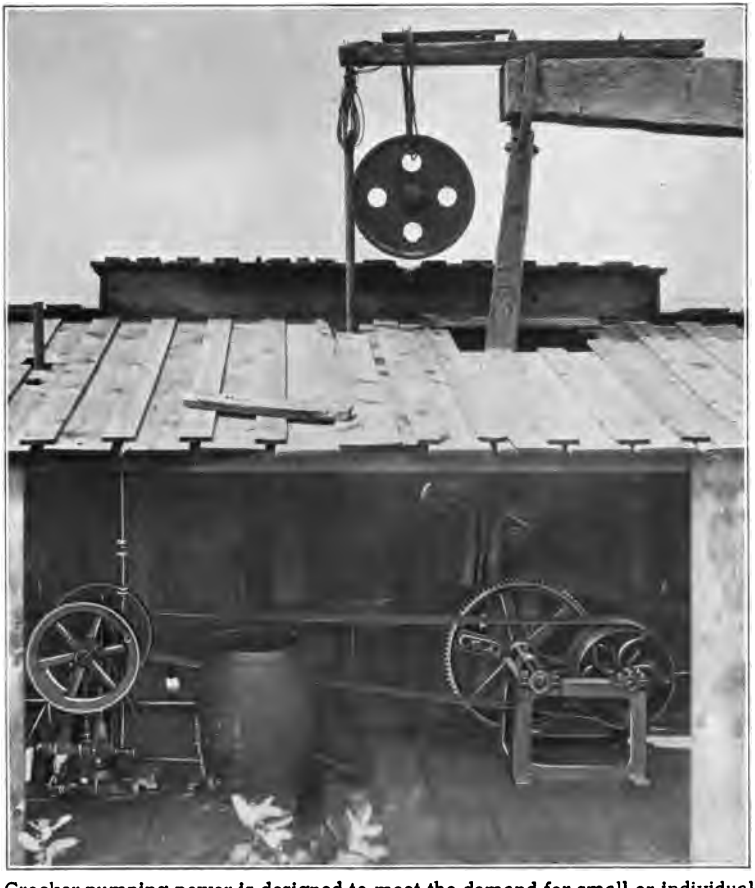
For 10, 15, and 20-horse-power gas engines	$42 00
For 25-horse-power gas engines	48 00
Water pumps for gas engines	15 00
Electric ignition with alternating batteries	37 50

GAS ENGINE TUBES

Size - - inches	¼ x 5	¼ x 6	¼ x 7	¼ x 8	¼ x 9	⅜ x 5	⅜ x 6	⅜ x 7	⅜ x 8	⅜ x 9
Composition - each	$1 65	1 80	2 00	2 20	2 50	2 00	2 20	2 40	2 70	3 00
Welded - - "	25	30	33	35	40	25	30	33	35	40
Common - - "	14	20	24	28	30	14	20	24	28	30

CROCKER PUMPING POWER OUTFIT

Fig. 3351



The Crocker pumping power is designed to meet the demand for small or individual plants for pumping single wells. This is much more economical than an isolated steam plant, and the comparatively small expense of installation and operation frequently renders it more desirable than a long connection to a central power plant. The attachment may be made as shown in the illustration, or the gas engine may be directly belted to the main band wheel of the rig.

When this is effected, the friction of the rig iron shaft working in the wooden jack posts should be overcome by the insertion of ball bearing boxes.

The 2½-horse-power gas engine consumes about 50 cubic feet of gas per hour.

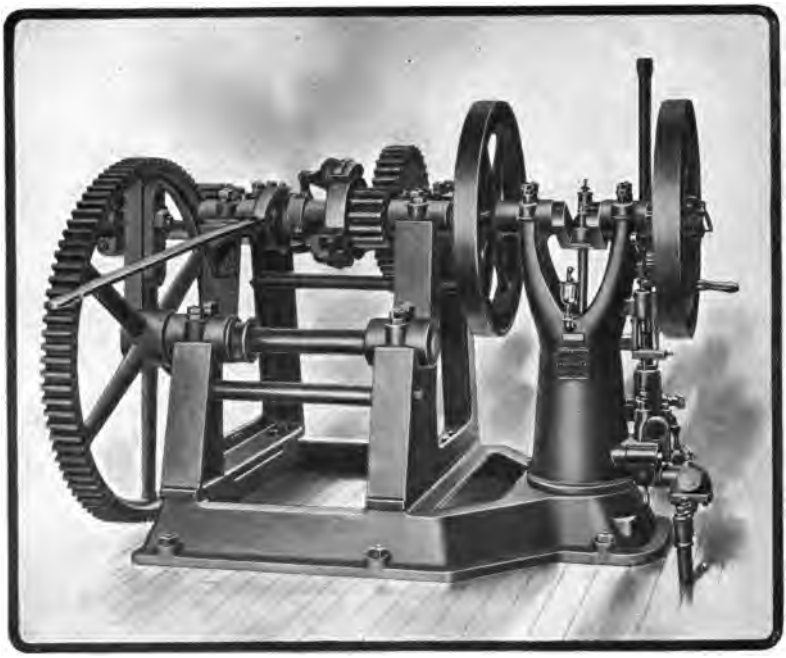
THE OUTFIT CONSISTS OF

	Weight, lbs.	Price
One 2½-horse-power gas engine	800	$160 00
One Crocker power	850	77 50
One belt		9 00
One gasometer		5 75
Fittings and bolts	----	1 75
Total	1,650	$254 00

Four-horse-power gas engine may be substituted for $90.50 additional.

2½ H. P. DIRECT CONNECTED DOUBLE REDUCTION POWER

Fig. 3352



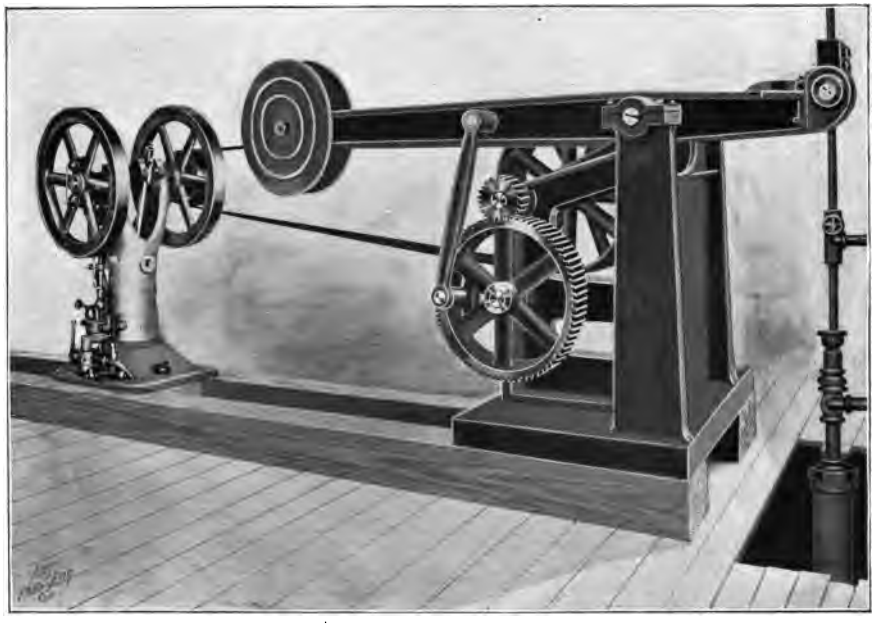
IT CONSISTS OF

the engine and power mounted on one base

	Weight, lbs.	Price
Engine Power	2,050	$274 00
Gasometer	----	5 75
Fittings and bolts	----	1 75
Total	2,050	$281 50

THE KLEIN GAS WELL PUMPING POWER

Fig. 3353



The outfit is designed for pumping water from gas wells from which the walking beam has been removed. It may be used in connection with an O'Dell barrel, and special ¾ inch tubing, which acts as rods and tubing through which the water is pumped, or it can be connected to the regular rods, and fluid and gas pumped into a separator.

CONSISTS OF

	Weight, lbs.	Price
One 2½-horse-power gas engine	660	$160 00
One Klein power	1,720	110 00
One belt	----	9 00
One gasometer	----	5 75
Fittings and bolts	----	1 75
Total	2,380	$286 50

Four-horse-power gas engine may be substituted for $90.50 additional.

LAY TONGS

Fig. 5139

Regular

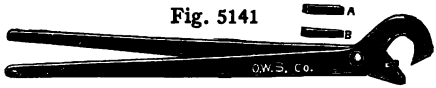
Figs. 5147

Extra heavy, long handles

Sizes, inches	Regular	Regular, steel lined	Ex. heavy, short handles	Ex. heavy, short handles, steel lined	Ex. heavy, long handles	Ex. heavy, long handles, steel lined	Weight, lbs.	Extra bits, dozen
¾	$3 50	----	3 75	4 50	4 00	----	6 to 13	
1	4 00	----	4 50	5 25	5 00	----	7 to 14	
1¼	4 25	----	4 75	5 75	5 50	----	14 to 24	2 50
1½	4 50	----	5 00	6 00	5 75	----	14 to 24	
2	5 00	5 40	5 60	6 25	6 00	6 75	24 to 33	
2½	5 50	5 75	6 00	7 50	6 75	8 00	26 to 35	
3	6 00	7 50	8 25	9 50	8 75	10 00	30 to 38	
3½	7 50	8 75	9 00	10 00	9 00	11 00	35 to 51	
4	9 00	11 00	9 50	11 50	9 75	12 00	51 to 57	
4½	10 00	12 00	13 00	14 50	14 00	15 00	55 to 74	3 50
5	10 50	12 00	13 00	15 00	14 00	15 00	55 to 75	
5⅛	11 00	13 00	14 00	15 50	15 00	16 00	55 to 76	
5⅝	12 00	13 75	15 00	16 00	16 00	17 00	57 to 76	
6	13 00	14 50	15 00	16 00	16 00	17 00	77 to 94	
6⅝	16 00	17 00	18 00	19 00	19 00	20 00	78 to 94	
7	22 00	23 00	25 00	26 00	26 00	27 00	115 to 130	
7⅝	25 00	27 50	27 50	31 00	29 00	31 00	--- to ---	5 00
8	25 00	27 50	27 50	31 00	29 00	31 00	119 to 134	
10	27 50	30 00	31 50	35 00	33 00	35 00	145 to 164	
12	32 00	37 00	36 00	42 00	40 00	42 00	175 to 212	

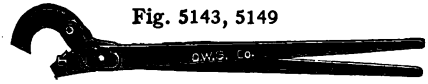
KLEIN REGULAR

Fig. 5141



KLEIN UNITED PATTERN

Fig. 5143, 5149



Sizes, inches	Regular	Regul'r, steel lined	Extra heavy, long handles	Extra heavy, long handl's, steel lined	United pattern	United pattern, steel lined	United pattern, extra heavy, long handles	United pattern, ex. heavy, long handles, steel lined	United pattern, ex. heavy, short handles, steel lined	Weight, lbs.
¾	$4 00	----	5 00	----	----	----	----	----	----	10 to 13
1	4 50	----	5 50	----	----	----	----	----	----	10 to 24
1¼	5 00	----	6 00	----	----	----	----	----	----	12 to 24
1½	5 25	----	6 50	----	----	----	----	----	----	24 to 28
2	5 50	6 00	7 00	7 25	6 50	6 50	8 00	8 25	8 00	24 to 34
2½	6 00	6 75	7 75	9 00	7 00	7 50	9 00	9 75	9 50	25 to 35
3	6 75	8 00	9 50	11 50	7 50	8 75	11 00	12 50	12 00	30 to 48
3½	8 00	----	11 00	13 00	9 00	----	-----	14 00	-----	30 to 49
4	9 50	11 50	12 50	14 00	10 50	12 50	13 50	15 00	14 50	51 to 55
4½	10 50	-----	14 00	15 00	-----	-----	-----	-----	-----	55 to 74
5	11 00	12 50	14 50	16 00	12 00	14 00	15 50	-----	17 00	55 to 75
5⅛	12 00	-----	15 00	17 00	-----	-----	-----	-----	-----	55 to 76
5⅝	13 00	14 50	16 00	18 00	14 00	15 50	-----	-----	-----	57 to 76
6	14 00	15 50	16 00	19 00	15 00	16 50	18 00	20 00	19 50	77 to 94
6⅝	17 00	-----	-----	-----	-----	-----	-----	-----	-----	78 to ---
7	23 00	-----	-----	-----	-----	-----	-----	-----	-----	115 to ---
8	26 00	29 00	29 00	32 50	27 50	30 00	31 00	34 00	33 00	119 to 134
10	28 50	31 00	32 00	35 00	30 00	33 00	34 00	37 00	36 00	145 to 164
12	33 00	36 00	37 00	42 00	34 00	37 00	40 00	45 00	44 00	175 to 212

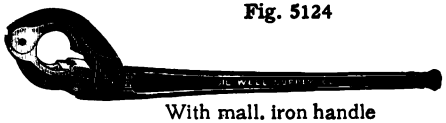
Bits ¾" to 6" inclusive, per doz. - - $2 00 - 6⅝" to 12", per doz. - - - - - $ 2 50
Wedges ¾" to 6" inclusive, per doz. - - 3 25 - 6⅝" to 12", per doz. - - - - - 4 00

CRUMBIE TONGS

Fig. 5123

Wrought iron handle

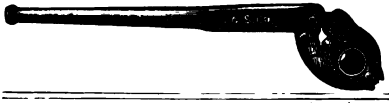
Fig. 5124



With mall. iron handle

Sizes - - - - - - - - inches	¾	1	1¼	1½	2	2½	3	3½
Weight - - - - - - - - lbs.	**3**	**4**	**6**	**7**	**14**	**17**	**32**	**37**
Tongs - - - - - - - - each	$2 25	2 50	3 25	3 50	4 50	5 00	8 25	9 00
Short jaws - - - - - - - each	75	75	90	1 00	1 25	1 25	2 00	2 75
Long jaws - - - - - - - each	1 00	1 00	1 10	1 25	1 50	1 50	2 50	3 25
Handles - - - - - - - each	1 00	1 00	1 25	1 50	1 75	1 75	2 75	3 00
Bits - - - - - - - - each	35	35	35	38	41	41	55	55
Sets screws - - - - - - - each	06	06	06	06	06	06	06	06
Set screw and spring - - - each	----	----	----	----	25	25	----	----

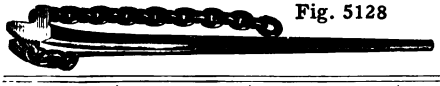
Fig. 5125



JUMBO TONGS AND PARTS

Sizes - - - - - - - - inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Weight - - - - - - - - lbs.	**2.5**	**3**	**4**	**6**	**8**	**10**	**14**	**15**	--	--
Tongs, regular - - - - - each	$1 30	1 50	1 80	2 00	2 20	2 50	3 00	3 50	4 20	5 00
Handles, regular - - - - each	50	50	60	60	70	70	1 50	1 50	2 20	2 20
Long jaws, regular - - - each	40	40	50	70	80	90	1 10	1 10	1 50	1 50
Short jaws, regular - - - each	40	40	50	70	80	90	1 00	1 00	1 30	1 30
Tongs, heavy - - - - - each	----	----	----	----	----	----	3 50	4 00	----	----
Handles, heavy - - - - - each	----	----	----	----	----	----	1 75	1 75	----	----
Long jaws, heavy - - - - each	----	----	----	----	----	----	1 20	1 20	----	----
Short jaws, heavy - - - - each	----	----	----	----	----	----	1 10	1 10	----	----
Dies - - - - - - - - each	16	16	16	16	24	24	32	32	32	32
Springs - - - - - - - - each	06	06	06	06	06	06	06	06	06	06
Triggers - - - - - - - - each	06	06	06	06	06	06	06	06	06	06
Rivets - - - - - - - each	12	12	12	12	12	12	12	12	12	12

Fig. 5128



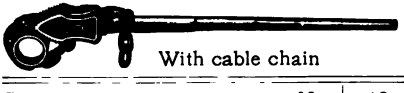
ROBBINS PATENT CHAIN TONGS

No.	Length of lever, inches	Size of lever near claw, inches	Size of chain, inches	Weight, lbs.	Size of pipe adapted to, inches	Price
2	25	1¼	5/16	8	1 to 2	$5 50
3	33	1⅜	⅜	13	1¼ to 4	6 25
4	44	1½	7/16	20	2 to 6	9 00
5	56	1¾	½	37	2½ to 8	12 50
6	72	2	⅝	58	4 to 10	16 00
7	80	2¼	¾	110	4 to 16	30 00
8	90	2¾	⅞	172	4 to 16	50 00

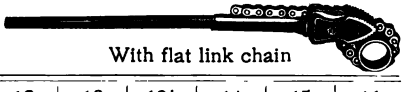
Fig. 5130

VULCAN TONGS

Fig. 5131



With cable chain



With flat link chain

Sizes - - - - - - - - No.	10	11	12	13	13½	14	15	16
Capacity, size pipe - - inches	⅛ to ¾	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Length over all - - - - inches	13¾	20	27	37	44½	50½	64½	87
Weight - - - - - - - - lbs.	**1¾**	**4¾**	**8¾**	**16**	**21**	**29**	**49**	**137**
With cable chain - - - - - - -	$2 25	3 25	4 50	6 25	7 75	9 50	16 00	40 00
With flat link chain - - - - - -	2 50	3 50	5 00	7 00	9 00	11 00	18 00	40 00

For Vulcan Tong parts see next page.

VULCAN TONG PARTS

Sizes - - - - - - - - - No.	10	11	12	13	13½	14	15	16
Extra Cable Chain - - - each	$0 50	$0 75	$1 00	$1 75	$2 00	$2 50	$4 00	$13 00
" Flat Link Chain - - "	75	1 00	1 50	2 50	3 25	4 00	6 00	13 00
" Handle - - - - - - "	75	1 00	1 50	2 25	3 00	4 00	6 00	14 00
" Jaws - - - - - - per pair	1 00	1 75	2 75	4 00	4 75	5 50	7 50	16 00
" Jaw Bolt - - - - - each	10	10	10	12	15	15	25	50
" Pin - - - - - - - - "	02	02	02	03	03	03	05	05

CASING TONGS OR PIPE GRIPS

FOR TURNING CASING

Fig. 5155

Number - - - - - - - - -	1	2
Size casing for - - - inches	4 to 6⅝	6⅝ to 13
Each - - - - - - - - - -	$2 75	$3 25

Fig. 5156

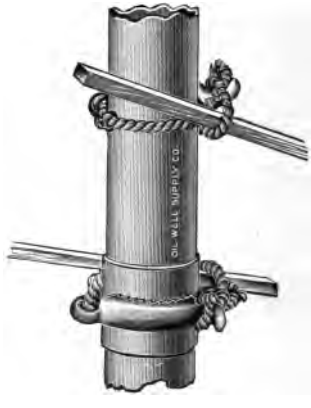
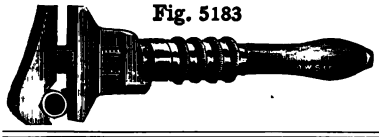


Fig. 5183



PIPE WRENCH

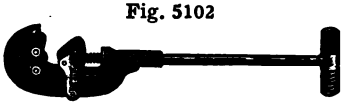
BRIGGS COMBINATION

Sizes - - - - - - - - - - - - - - inches	8	10	12	15	18
Weight - - - - - - - - - - - - - - lbs.	**1.4**	**2**	**3.1**	**4.4**	**7.5**
Per dozen - - - - - - - - - - - - - - -	$23 00	25 25	28 50	40 50	72 00

PARTS OF BRIGGS COMBINATION WRENCH

Size - - - - - - - - - - - - - - inches	8	10	12	15	18
Slides only - - - - - - - - - - - - - each	$0 40	50	60	80	1 20
Steel dogs - - - - - - - - - - - - - each	16	20	24	30	40
Sleeves - - - - - - - - - - - - - - each	24	30	40	50	70
Tips and ferrules - - - - - - - - - - each	04	04	04	06	08
Handles - - - - - - - - - - - - - each	12	12	14	16	20
Nuts - - - - - - - - - - - - - - - each	16	20	24	30	40

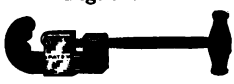
Fig. 5102



SAUNDERS PIPE CUTTER

Number -	1	2	3	4
Cuts pipe from - - - - - - - - - - - inches	⅛ to 1	1 to 2	2 to 3	2½ to 4
Weight - - - - - - - - - - - - - - - - lbs.	**3.2**	**6.4**	**12**	**15**
Complete - - - - - - - - - - - - - - - each	$3 00	4 50	11 00	18 00
Block and wheel - - - - - - - - - - - - - each	1 25	1 75	2 75	3 50
Cutter wheels - - - - - - - - - - - - - - each	24	32	60	60
Rollers - - - - - - - - - - - - - - - - each	24	32	50	50
Pins - - - - - - - - - - - - - - - - - each	10	10	15	15

Fig. 5098



BARNES THREE WHEEL PIPE CUTTER

Fig. 5099

Number - - - - - - - - -	1	2	3	4	5	6	7
Cuts from - - - - inches	⅛ to 1	½ to 2	1½ to 3	2½ to 4	4 to 6	6 to 8	9 to 12
Weight - - - - - - lbs.	**3**	**5**	**13**	**15**	**24**	**30**	**35**
Price - - - - - - - - - -	$4 50	6 00	10 00	20 00	30 00	40 00	50 00
Wheels - - - - - - each	25	30	40	50	75	75	75
Pins - - - - - per dozen	1 00	1 00	1 00	2 00	2 00	2 00	2 00

Fig. 5095

STANWOOD PIPE CUTTER

Fig. 5096

Number -	1	2	3
Cuts pipe from - - - - - - - - - - - - - - - inches	⅛ to 1	¾ to 2	2 to 3
Weight - - - - - - - - - - - - - - - - - - lbs.	**3.2**	**8**	**22**
Fig. 5095 - - - - - - - - - - - - - - - - - each	$1 50	2 25	7 00
Cutter wheels, fig. 5096 - - - - - - - - - - - - each	12	18	25
Cutter blocks and wheels - - - - - - - - - - - - each	45	60	1 25
Pins - - - - - - - - - - - - - - - - - - - each	05	05	08

SOLID STOCK AND DIES

No. A

Fig. 5061

With single row of dies

Threads $\frac{1}{8}$ to $\frac{1}{2}$ inch pipe, fig. 5061 - - - - - - - - - - - - - - - - - - $7 00
Extra die plates - each, 5 00

Weight, 7 lbs.

No. AA

Fig. 5063

With double row of dies

Threads $\frac{1}{8}$ to 1 inch pipe, fig. 5063 - - - - - - - - - - - - - - - - - - $10 00
Extra die plates, cutting $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$ - - - - - - - - - - - - - - - - - each, 3 50
Extra die plates, cutting $\frac{1}{2}$, $\frac{3}{4}$ and 1 - - - - - - - - - - - - - - - - - each, 4 00

Weight, 12 lbs.

MALLEABLE STOCK WITH SOLID DIES

Nos. 0, 1 and 1½

Fig. 5065

Without leader screw

No. 2

Fig. 5067

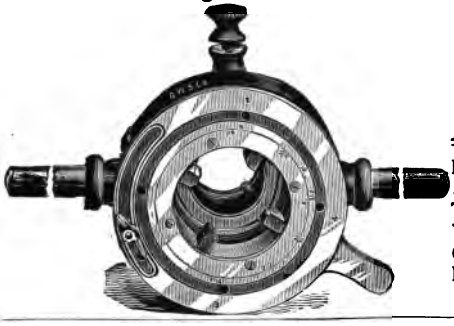
With leader screw

Numbers	0	1	1½	1¾	2 With leader screw
Pipe sizes of dies - - - - - inches	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$	$\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1	$\frac{3}{4}$, 1, 1¼	1, 1¼, 1½	1¼, 1½, 2
Dimensions of dies - - - - - inches	2 x ½	2½ x ¾	3 x ¾	3 x ¾	4 x ⅞
Weight, complete - - - - - - lbs.	**7**	**14**	**9**	----	**24**
Stock, complete, with r. h. dies - - -	$9 50	15 00	13 50	13 50	20 00
Stocks only - - - - - - - - each	3 50	5 00	6 00	6 00	9 50
Extra dies, right or left - - - - each	1 50	2 00	2 50	2 50	3 50
Extra guides - - - - - - - - each	25	35	45	45	60
Die frames - - - - - - - - - each	----	30	40	40	50

Dies for threading 1¾-inch pipe with English threads can also be furnished.

STOCKS AND DIES

Fig. 5073



WITH RATCHET ATTACHMENT AND ADJUSTABLE DIES

With leader screw

Numbers	2	3½
Threads pipe, sizes - - inches	2½ to 4	5 to 6
Weight - - - - - - - - **lbs.**	100	----
Complete - - - - - - - - -	$50 00	100 00
Extra dies, per set of four, cutting two sizes - - - - - -	5 00	7 00

WITH FOUR ADJUSTABLE DIES AND LEADER SCREW

Weight, 25 lbs.

No. 3 threads .1, 1¼, 1½ and 2" pipe - - - - - - - - - - - -	$20 00
Extra dies, per set of 4, cutting two sizes - - - - - - - - - - -	2 00

Fig. 5075

PARTS FOR FIG. 5075

Body - - - - - - - - - - - -	$4 50	Cast iron yoke rings - - -	each, $0 50
Yokes - - - - - - - - - -	each, 1 25	Pawl spring and button - -	each, 1 00
Cam plates - - - - - - -	each, 3 00	Handles - - - - - - - -	each, 1 00
Leader screws - - - - - -	each, 1 00	Face plate screws - - - -	each, 03
Thumb screws - - - - - -	each, 40	Leader screw set screws - -	each, 20
Small brass rings - - - - -	each, 1 00	Bushings - - - - - - - -	each, 25

Fig. 5090

BEAVER DIE STOCK

Cuts 1", 1¼", 1½", 2" Pipe

No. 20, 1" to 2", complete - - - - - -	$30 00
No. 20, Extra Dies, per set - - - - - -	3 50

Fig. 5080

WITH SECTIONAL DIES FOR LARGE PIPE

Cast iron body, brass leader screw, six dies

Used largely for laying pipe lines. Can be used on the ground.

	With two handles				With one handle	
			Casing			
Threading pipe - - sizes	4	5	5⅝	6	8	10
Weight, complete - lbs.	55	100	----	115	235	222
Length of handles - - in.	40	48	----	48	72	72
Price, complete - -	$42 00	70 00	85 00	100 00	125 00	140 00
Extra dies - per set	6 00	7 00	9 00	12 00	13 00	14 00

Fig. 5163

SMITH COMBINATION VISE

Size number	1	2	3
Size pipe will catch - inches	⅛ to 2	¼ to 3	¼ to 4
Weight - - - - - - lbs.	**47**	**70**	**100**
Price	$16 00	20 00	28 00

PARTS OF SMITH COMBINATION VISE

Size number for	1	2	3
Back jaw, with parallel jaw	$3 00	3 75	4 25
Front or sliding jaw, with parallel jaw	3 00	3 75	4 25
Long "V" pipe jaw, single	75	1 00	1 25
Short "V" pipe jaw, double	1 25	1 75	2 25
Screw nut, handle and collar	1 75	2 00	2 25
Nut	25	35	45
Hand nut	25	25	25
Bench bolt	15	15	15
Large washer, swivel	20	20	20
Small washer	10	10	10
Collar for screw	10	10	10
Parallel jaw	50	50	50

O. W. S. CO. HINGE MALLEABLE PIPE VISE

Fig. 5158

Number	Capacity	Weight, lbs.	Price
10	⅛ to 2½ inch pipe	17	$10 00
9	⅛ to 2 inch pipe	12	8 00

Fig. 5158

MALLEABLE IRON PIPE VISE

Fig. 5160

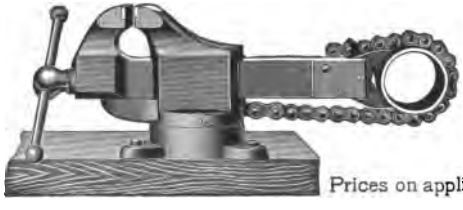
Size Number	1	2
Size pipe will catch - - - - inches	⅛ to 2	⅛ to 3
Weight - - - - - - - - - lbs.	**20**	**26**
Price	$10 00	14 00
Extra jaws - - - - - - per set	2 50	3 00

Fig. 5160

LONG'S PATENT LOCK AND SWIVEL BASE VISE

COMBINATION MACHINIST'S AND PIPE

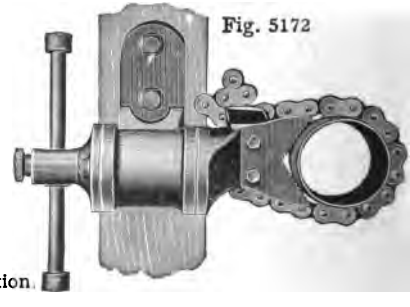
Fig. 5171



Prices on application.

LONG'S PATENT LOCK PIPE VISE

Fig. 5172



FORGE TOOLS, ETC.

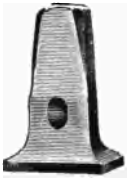
BLACKSMITH'S SLEDGES
Fig. 2441 **Fig. 2443**

Straight peen

Cross peen

HARDY
Fig. 2445

FLATTER
Fig. 2447



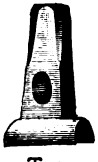
SET HAMMER
Fig. 2449

FULLERS
Fig. 2451 **Fig. 2453**

Top

Bottom

SWEDGES
Fig. 2455 **Fig. 2457**



Top

Bottom

PUNCHES
Fig. 2459 **Fig. 2461**

Round

Square

CHISELS
Fig. 2463 **Fig. 2465**

Hot

Cold

Blacksmith sledges 3 to 5 lbs. fig. 2441 or fig. 2443, solid steel - - - - - - per lb., $0 36
Blacksmith tools 5½ lbs. or over figs. 2445 to 2465, inclusive - - - - - - - per lb., 30

Fig. 2435

3-inch

PULLEYS FOR FORGE

Clothes line pulleys

No. 65, 3-inch, fig. 2435 - - - - per dozen, $1 85

Weight, each, 12 ounces.

Forge, 5-inch, fig. 2437 - - - - per dozen, 5 00

Weight, each, 3 pounds.

Forge, 5 inch, Hartz steel With self oiling Sheave - - per dozen, 6 00

Fig. 2437

5-inch

FORGE TOOLS, ETC.

ANVIL

Fig. 2425

NEW STYLE CAST IRON ANVIL

Fig. 2426

BALL PEEN HAMMER

Fig. 2427

ANVILS—Fig. 2425

Eagle, weighing from 100 to 800 pounds - - - - - - - - - - - - per pound, $0 08½

NEW STYLE DERRICK ANVIL, CAST IRON—Fig. 2426

Weight, 350 pounds - $22 00

BALL PEEN HAMMERS—Fig. 2427

No.	Weight, lbs.	Per dozen	No.	Weight, lbs., oz.	Per dozen
70	3	$20 00	73	1¼ --	$12 25
--	2	16 50	--	-- --	-----
70½	2¼	17 00	74	1 --	11 25
71	1⅞	15 00	75	-- 13	10 50
72	1½	13 50	76	-- 10	10 00

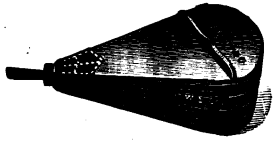
BLACKSMITH'S TONGS

Fig. 2429

Extra heavy, weight, 4½ pounds - - - - - - - - - - - - - - - - - - each, $1 00

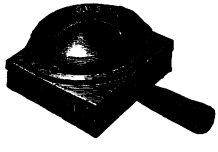
BELLOWS

Fig. 2431



TUYERE IRON FOR FORGE

Fig. 2433



BELLOWS—Fig. 2431

Size - - - - inches	30	32	34	36	38	40	42	44	46	48	50
Manufacturer's list - -	$15 00	17 00	19 00	21 00	24 00	28 00	34 00	40 00	45 00	50 00	60 00
Weight - - - - lbs.	-----	-----	-----	-----	-----	**150**	**160**	**175**	-----	-----	-----

TUYERE IRON—Fig. 2433

Duck's Nest - $2 00

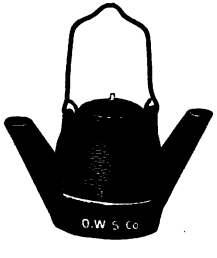
WATER TUYERES—WROUGHT IRON

Not illustrated

No.	Length, inches	Price
1	12	$4 00
2	13½	4 50
3	15	5 50
4	16½	6 00

DERRICK LAMP—

Fig. 2440



Weight, 15 lbs,
Each - - $1 50

STEAM BLOWER

USED ON DRILLING RIGS IN PLACE OF BELLOWS

Fig. 2430

Weight, 73 lbs.

No. 3, 3¼" air outlet, fitted for 2" pipe - - - - - - - - - - - - - - - - 15 00

ALL BLOWERS ARE FURNISHED SECURELY BOLTED ON WOOD BASE

and fitted with nozzle for pipe, ½" nipple and valve for steam connection, 2 grease cups and drain cock.

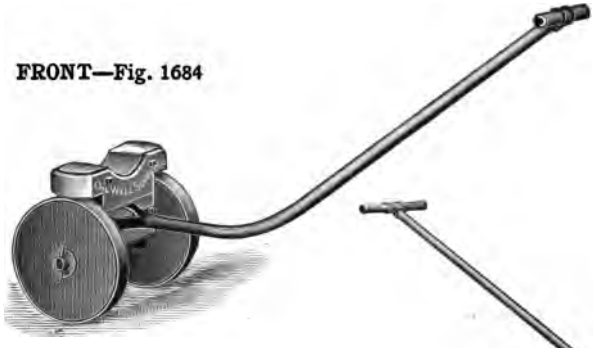
The No. 3 Blower is of suitable size for use in Standard Rig.

The Blowers are simple, strong and effective—no belts or pulleys are required. Operated by steam or compressed air.

Blast regulated by Globe Valve.

CASING WAGONS

FRONT—Fig. 1684



Weight, 75 lbs.

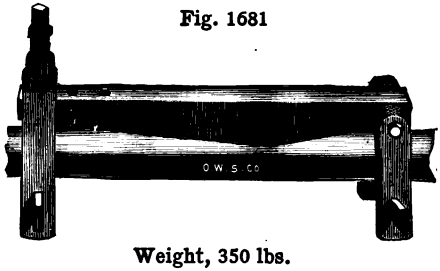
REAR—Fig. 1684-A

Weight, 85 lbs.

Per pair - - - - - - - - $20 00

STEM STRAIGHTENER

Fig. 1681



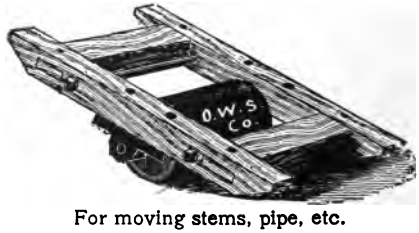
Weight, 350 lbs.

To straighten auger stems or sinker bars. Can be applied when lying on the ground or standing in the derrick.

Prices on application.

DOLLIE

Fig. 1683.



For moving stems, pipe, etc.

Size, inches	Size roller, inches	Weight, lbs.	Price
15¾ x 18¾	10 x 6	42	$6 00
19½ x 26	12 x 6	58	8 00

DERRICK STOVE

Fig. 2424

This stove was designed to meet the requirements of the derrick. The castings are heavy and constructed to withstand hard service.

Made in four sections, easily taken apart and transported.

Weight, 340 lbs.

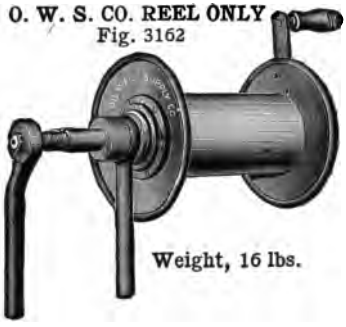
Complete - $20 00

MEASURING LINES AND REELS

WELL-MEASURE WIRE ONLY
Fig. 3160

Wound on spool for shipping purposes

O. W. S. CO. REEL ONLY
Fig. 3162



Weight, 16 lbs.

McCLURE'S PATENT REEL AND WIRE COMPLETE
Fig. 3164

McCLURE'S PATENT REEL ONLY
Fig. 3166

Weight, 12 lbs.

MEASURING LINES AND REELS

PRICES FOR LINES ONLY WITHOUT REELS

Length, Feet	Aluminum Wire Lines	Steel Wire Lines	Length, Feet	Aluminum Wire Lines	Steel Wire Lines	Length, Feet	Aluminum Wire Lines	Steel Wire Lines
500	$7 90	$6 40	1700	$18 85	$13 75	2900	$29 95	$21 25
600	8 80	7 00	1800	19 80	14 40	3000	30 90	21 90
700	9 70	7 60	1900	20 70	15 00	3100	31 80	22 50
800	10 55	8 15	2000	21 65	15 65	3200	32 75	23 15
900	11 45	8 75	2100	22 55	16 25	3300	33 65	23 75
1000	12 40	9 40	2200	23 50	16 90	3400	34 60	24 40
1100	13 30	10 00	2300	24 15	17 25	3500	35 50	25 00
1200	14 25	10 65	2400	25 35	18 15	3600	36 45	25 65
1300	15 15	11 25	2500	26 25	18 75	3700	37 35	26 25
1400	16 10	11 90	2600	27 20	19 40	3800	38 30	26 90
1500	17 00	12 50	2700	28 10	20 00	----	------	------
1600	17 95	13 15	2800	29 05	20 65	----	------	------

Prices for Measuring Lines Complete with Reel and Weight

Add to above list prices for McClure Reel and Weight - - - - - - - - - - - $5 50
Add to above list prices for O. W. S. Co. Reel and Weight - - - - - - - - - - - 11 00

MEASURING LINE REELS AND PARTS

McCLURE

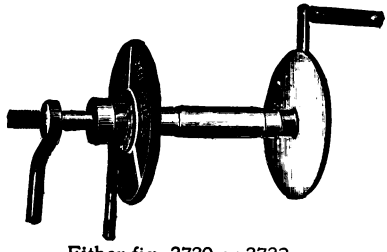
Complete, each - - - - - - - - $6 50
Shafts, each - - - - - - - - - 3 00
Brakes, each - - - - - - - - - 1 00
Locknuts, each - - - - - - - - 1 00
Handles, each - - - - - - - - 50
Cones, each - - - - - - - - - 10
Weights, each - - - - - - - - 50

O. W. S. CO.

Complete, each - - - - - - - - $12 00
Shafts, each - - - - - - - - - 5 00
Brakes, each - - - - - - - - - 1 00
Locknuts, each - - - - - - - - 1 00
Handles, each - - - - - - - - 50
Weights, each - - - - - - - - 50

TORPEDO REELS

O. W. S. CO.—Fig. 3730



McCLURE'S PAT.—Fig. 3732

Either fig. 3730 or 3732.

Size, 12 x 13 inches - - -	$23 00
Size, 12 x 14 inches - - -	25 00
Size, 12 x 18 inches - - -	28 00

TORPEDO LINES

Manila, 3 strand, per lb. - -	$0 25
Manila, 4 strand, per lb. - -	30

For torpedo wire, see page 332.

PARAFFINE AUGER

Fig. 3212

To clean paraffine out of tubing.

Short auger - - - - - - $15 00 Long auger - - - - - - - $20 00

ANCHOR—Fig. 3718

In lengths to suit intended location of torpedo.

TORPEDOES

TORPEDO—Fig. 3710

To use with weight and guide line.

WEIGHT OR GO-DEVIL

For firing the torpedo.

Fig. 3720

Dropped in well after torpedo is in place.

JACK SQUIB

A small torpedo used to "set off" a large one after other means have failed.

Fig. 3716

Fig. 3714

TORPEDO

To use with a go-devil; is lowered with a line which is drawn out before firing.

LINE SQUIB

Used for the same purpose as fig. 3716

Fig. 3722

Shells and parts to order.

Fig. 3712—Showing position of torpedo after lowering to bottom of well.

Anchor. Go-devil.

Oil bearing rock or sand.

Pocket in well below oil sand, to hold detritus.

WOOD DRY HOLE PLUGS

COMMON

Fig. 3176

MALE AND FEMALE

Fig. 3174

MALE AND FEMALE WITHOUT PLUG

Fig. 3178

MANDREL

Fig. 3170

Fig. 3180

With ring

CAST IRON DRY HOLE PLUGS

Size, inches	Weight, lbs.
4	12
4½	13
5	17
5⅝	24
6	30
6¼	33
7	47
7⅝	60
8	71
8¼	77

Fig. 3182

Oblong

Cast iron, all sizes, fig. 3180 or 3182 - - - per lb., $0 05

Size hole - - - - - - inches	4¼	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝	8¼	10	13
Wood, fig. 3176 - - - - each	$0 50	50	50	75	75	1 00	1 00	1 25	1 25	2 00	5 00
Weight, fig. 3176 - - - - lbs.	**4**	**4.5**	**5**	**6.5**	**8**	**10**	**12**	**14**	**24**	**30**	**40**
Wood, fig. 3174 - - - - each	1 75	1 75	1 75	2 00	2 00	2 25	2 25	2 50	2 50	4 00	10 00
Wood, fig. 3178 - - - "	2 00	2 00	2 00	2 50	2 50	2 75	2 75	3 25	3 25	5 00	11 00
Wood, fig. 3170 - - - - "	2 50	2 50	2 50	3 00	3 00	3 50	3 50	4 25	4 25	6 50	13 00

Fig. 2673

WALL GRIP

Used in connection with a wooden dry hole plug to prevent the plug from loosening.

Prices on specification.

STANDARD 1,000-LB. GAS PRESSURE GAUGES

Size	Brass Case	N. P. Case
3-inch dial - - - - - - - - - - - -	$20 00	20 60

Morocco holder for above - - - - - - - - - - - - - - - - - - - $2 50

MACKSBURG OR ARMOR PACKER

Fig. 2885

Size of tubing, inches	Size of hole, inches	Length of rubber, inches	Weight, lbs.	Complete	PARTS			
					Rubber only	Frame only	Cone only	Cone with coupling
2	4¼	10	27	$11 00	4 00	9 00	3 00	4 50
2	4¼	12	28	12 00	4 50	9 00	3 00	4 50
2	4½	10	28	11 50	4 25	9 00	3 00	4 50
2	4½	12	29	12 50	5 00	9 00	3 00	4 50
2	4⅞ or 5	10	28	14 00	6 00	9 00	3 00	4 50
2	4⅞ or 5	12	30	15 00	7 25	9 00	3 00	4 50
2	5 9/16	10	40	15 50	7 50	9 00	3 00	4 50
2	5 8/16	12	42	17 00	9 00	9 00	3 00	4 50
2	5⅝	9	45	16 50	8 00	9 00	3 00	4 50
2	5⅝	10	46	17 50	8 75	9 00	3 00	4 50
2	5⅝	12	48	19 25	10 00	9 00	3 00	4 50
2	5⅝	16	58	23 00	14 00	9 00	3 00	4 50
2	6 or 6¼	10	54	21 50	9 75	9 50	3 00	4 50
2	6 or 6¼	12	57	24 00	11 50	9 50	3 00	4 50
2	6 or 6¼	16	63	29 00	15 50	9 50	3 00	4 50
2	6⅝	10	58	23 00	12 00	10 50	3 50	5 00
2	6⅝	12	60	25 50	14 25	10 50	3 50	5 00
2	6⅝	16	68	31 50	19 00	10 50	3 50	5 00
2	7⅝	10	76	34 00	18 00	18 00	6 00	8 00
2	7⅝	12	80	38 00	24 00	18 00	6 00	8 00
2	7⅝	16	86	46 50	29 75	18 00	6 00	8 00
2	8 or 8¼	10	87	37 50	24 25	19 00	6 50	8 50
2	8 or 8¼	12	92	42 50	29 00	19 00	6 50	8 50
2	8 or 8¼	16	102	51 75	35 00	19 00	6 50	8 50
2	11⅝	12	105	89 50	59 00	40 00	8 50	11 00
2½	5⅝	12	50	25 50	9 00	12 50	4 50	6 00
2½	6 or 6¼	12	52	29 75	11 50	13 50	4 50	6 00
2½	8¼	12	84	47 00	26 00	27 50	6 00	8 00
3	5⅝	12	65	22 25	8 00	12 50	4 50	6 00
3	6 or 6¼	12	69	25 75	11 50	14 00	4 50	6 00
3	6 or 6¼	16	77	36 00	14 50	14 00	4 50	6 00
3	7¼	12	85	37 50	18 00	31 50	6 00	8 00
3	7⅝	12	87	40 00	20 75	35 00	6 00	8 00
3	7⅝	16	90	44 50	26 00	35 00	6 00	8 00
3	8 or 8¼	12	98	44 50	23 00	35 00	7 00	9 00
3	8 or 8¼	16	106	48 00	28 75	35 00	7 00	9 00
3	9⅝	12	102	55 50	36 00	40 00	----	----
3	9⅝	16	110	66 00	45 00	40 00	----	----
4	8¼	12	100	44 00	22 00	42 00	----	----
4	9⅝	12	110	55 00	34 00	46 00	----	----

Fig. 2899

HEINZ CUP PACKER—Fig. 2899

Size tubing, inches	1¼	2	2	2	2	2
Size hole - - - -	4	3¼	4¼	5⅝	6¼	7¼
Price - - - - - -	$4 00	2 75	2 75	4 00	4 25	11 00
Weight - - lbs.	-----	7	9	16	21	-----

Size tubing, inches	2	2	2½	3 or 3¼	3 or 3¼	3 or 3¼
Size hole - - - -	8¼	8⅝	5⅝	5	5⅝	6¼
Price - - - - - -	$12 50	13 25	5 00	5 00	5 00	5 00
Weight - - lbs.	------	-----	23	----	----	9

Size tubing, inches	4 or 4¼	4 or 4¼	5	5⅝	5⅝	6⅝
Size hole - - - -	5⅝	6 or 6¼	6 or 6¼	6 or 6¼	8 or 8¼	8 or 8¼
Price - - - - - -	7 00	7 25	8 50	9 50	9 50	10 00
Price two cup - - -	9 00	9 50	----	---	----	-----

Add for gas-pipe attachment, see fig. 2895 - - - - - $0 50

Fig. 2895

With gas escape

DRESSER PACKERS

REGULAR

Fig. 2887

Fig. 2897

	Size of Tubing, inches	Size of Hole, inches	Length of Rubber	Weight, lbs.	Complete	Rubber only	Frame only
FIG. 2887	2	4	10	26	$12 00	$6 00	$6 00
	2	4	16	48	15 00	9 00	6 00
	2	4¼	10	26	12 00	6 00	6 00
	2	4¼	16	48	15 00	9 00	6 00
	2	4½	10	--	12 00	6 00	6 00
	2	4½	16	48	16 00	10 00	6 00
	2	5	10	34	14 00	8 00	6 00
	2	5	16	43	18 00	12 00	6 00
	2	5 3/16	16	--	21 00	14 00	7 00
	2	5⅝	10	--	17 00	10 00	7 00
	2	5⅝	13	57	20 00	13 00	7 00
	2	5⅝	16	58	22 00	15 00	7 00
	2	6	16	75	26 00	18 00	8 00
	2	6¼	16	75	26 00	16 00	10 00
	2	6½	16	75	28 00	18 00	10 00
	2½	4¼	16	--	13 00	8 00	5 00
	2½	4½	16	--	14 00	9 00	5 00
	2½	5	13	--	16 00	9 00	7 00
	2½	5⅝	13	--	21 00	15 00	6 00
	3	5	20	--	20 00	10 00	10 00
	3	5 3/16	20	--	25 00	15 00	10 00
	3	5⅝	20	63	26 00	15 00	11 00
	3	6	20	--	30 00	19 00	11 00
	3	6¼	20	--	32 00	21 00	11 00
	3	6½	16	80	31 00	19 00	12 00
	4	5⅝	16	73	30 00	10 00	20 00
	4	6 or 6¼	16	--	30 00	11 00	19 00
	4	6½	16	--	35 00	15 00	20 00
	4¼, 5, 5 3/16	5⅝, 6¼, 6½	16	40	30 00	10 00	20 00
	5⅝	7¼ or 8	16	--	35 00	16 00	19 00
	5⅝	8¼	16	--	40 00	21 00	19 00
	6 or 6¼	8 or 8¼	16	--	40 00	15 00	25 00
	6⅝	8	16	--	40 00	12 00	28 00
	8	10	16	--	68 00	18 00	50 00
FIG. 2893	1½	5 Pumping	10	20	16 00	12 00	4 00
	2	5⅝ "	10	23	21 00	17 00	4 00
	2	6¼ "	10	34	28 00	23 00	5 00
	2	6½ or 6⅝ "	10	--	32 00	26 00	6 00
	2	8 "	10	-	45 00	38 00	7 00

PUMPING PACKER WITH GAS ESCAPE

Fig. 2893

When specifying, be particular to state size of tubing, diameter of hole in which packer is to be used, and length of rubber.

WALL FASTENER, WITHOUT PACKER

Not illustrated

2 x 4 or 4¼	$14 00
2 x 5⅝	15 00
3 x 5⅝	16 00
4¼ x 5⅝	17 00

PONY PACKER

Fig. 2897

Size, inches	Size of tubing, inches	Complete	Rubber only	Coupling only
¾	1½	$3 00	$1 00	$0 75
1	2	4 00	1 50	75
1¼	2½	9 50	2 75	1 25
1	3	10 50	4 00	1 50
1¼	3	10 50	4 00	1 50

Used to pack in 2-inch tubing where gas pressure is not sufficient to force the oil to the surface.

"SUCCESS" WELL PACKERS

WITH RUBBER CUPS

FOR TUBING AND CASING

PATENTED DEC. 8, 1903

Fig. 2884

Double Packer for Top and Bottom of Sand

Fig. 2882-A

Tubing Packer, with Gas Escape

Fig. 2882

Tubing Packer

Fig. 2883

Style "A" Casing Packer

Fig. 2883-A

Style "B" Casing Packer

LIST

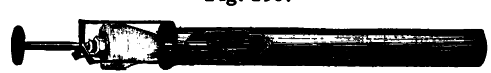
Size Tubing or Casing	Size Hole for	Without Gas Escape, each	With Gas Escape, each	Double Packers, each
2″ Tubing	4¼″	$8 50	- - -	- - - -
2″ "	5″	8 50	- - -	- - - -
2″ "	5⅝″	8 50	$8 50	- - - -
2″ "	6¼″	8 50	8 50	- - - -
3″ "	5⅝″	8 50	- - -	- - - -
3″ "	6¼″	8 50	- - -	- - - -
3½″ Casing	5⅝″	9 50	- - -	- - - -
3½″ "	6¼″	9 50	- - -	- - - -
4¼″ "	5⅝″	9 50	- - -	- - - -
4¼″ "	6¼″	9 50	- - -	- - - -
5⅝″ "	8″	- - -	- - -	$11 00
6¼″ "	8″	- - -	- - -	11 00

HOADLEY PACKER

Size of Tubing, inches	Size of hole, inches	WALL PACKER Length of Rubber				ANCHOR PACKER Length of Rubber					RUBBERS ONLY Length				
		12	14	16	20	10	12	14	16	20	10	12	14	16	20
2	4 or 4¼	$22 00	$25 00	$27 00	$32 00	$13 00	$15 00	$17 00	$19 00	$22 00	$5 00	$6 00	$7 00	$8 00	$10 00
2	4½ " 4⅝	23 00	26 00	28 00	33 00	13 00	15 00	17 00	19 00	22 50	6 00	7 50	8 50	9 50	12 00
2	4⅞ " 5	25 00	28 00	31 00	35 00	15 00	16 00	18 00	20 00	24 00	7 00	8 50	9 50	10 50	13 00
2	5½ " 5⅝	28 00	30 00	32 00	38 00	17 00	19 00	21 00	22 00	25 00	9 00	10 00	11 00	12 00	14 00
2	6 " 6¼	33 00	35 00	39 00	42 50	23 00	25 00	26 00	27 00	30 00	10 50	12 00	14 00	16 00	20 00
2	6½ " 6⅝	35 00	37 00	40 00	45 00	24 00	25 00	26 00	28 00	30 00	12 00	13 00	14 00	15 00	17 00
2½	4¼ " 4½	23 00	25 00	29 00	35 00	13 00	15 00	16 50	19 00	22 00	8 00	9 00	10 00	11 00	13 00
2½	4⅞ " 5	24 00	26 00	30 00	36 00	15 00	16 00	17 00	19 00	22 50	9 00	10 00	11 00	12 00	14 00
2½	5½ " 5⅝	30 00	32 00	35 00	40 00	18 00	19 00	20 00	22 00	25 00	10 00	11 00	12 00	13 00	15 00
2½	6 " 6¼	35 00	37 50	40 00	45 00	23 00	24 00	25 00	27 00	29 00	11 00	12 00	13 00	14 00	16 00
3 or 3¼	5½ " 5⅝	37 50	40 00	42 50	47 50	23 00	24 00	25 00	26 00	28 00	11 00	12 00	13 00	14 00	16 00
3 " 3¼	6 " 6¼	43 00	45 00	48 00	55 00	29 00	30 00	31 00	32 00	34 00	12 00	13 00	14 00	15 00	17 00
3 " 3¼	6½ " 6⅝	47 00	50 00	52 00	57 50	31 00	32 00	33 00	34 00	36 00	14 00	15 00	16 00	17 00	19 00
3½	5½ " 5⅝	42 00	44 50	46 50	52 50	.....	.....	.....	.....	.....	12 00	13 00	14 00	15 00	17 00
3½	6 " 6¼	45 00	47 00	49 00	55 00	.....	.....	.....	.....	.....	13 00	14 00	15 00	16 00	18 00
4 or 4¼	5½ " 5⅝	44 00	46 00	49 00	55 00	31 00	32 00	33 00	34 00	36 00	13 00	14 00	15 00	16 00	18 00
4 " 4¼	6 " 6¼	47 00	50 00	52 00	57 50	31 50	32 50	33 50	34 50	36 50	13 50	14 50	15 50	16 50	18 50
4 " 4¼	7½ " 7⅝	59 00	61 50	64 00	70 00	36 00	37 00	38 00	39 00	41 00	17 00	18 00	19 00	20 00	22 00
4 " 4¼	8 " 8¼	62 00	65 00	67 00	72 50	38 00	39 00	40 00	41 00	43 00	15 00	16 00	17 00	18 00	20 00
5	6½ " 6⅝	52 00	54 50	57 00	62 50	31 00	32 00	33 00	34 00	36 00	14 00	15 00	16 00	17 00	19 00
5⅝	7½ " 7⅝	65 00	67 50	70 00	75 00	36 00	37 00	38 00	39 00	41 00	16 00	17 00	18 00	19 00	21 00
5⅝	8 " 8¼	67 50	70 00	72 50	77 50	38 00	39 00	40 00	41 00	43 00	17 00	18 00	19 00	20 00	22 00
6 or 6¼	7½ " 7⅝	70 00	72 50	75 00	80 00	52 00	54 00	58 00	60 00	64 00	16 50	17 50	18 50	19 50	21 50
6 " 6¼	8 " 8¼	72 50	75 00	77 50	82 50	54 00	58 00	60 00	62 00	66 00	17 50	18 50	19 50	20 50	22 50
9	12	90 00	95 00	100 00	110 00	.....	.....	.....	.....	.....	20 00	22 00	24 00	26 00	30 00

SPETTIGUE PACKER

Fig. 2907



Size of tubing - - - - - - - - - - - - inches	2	3	4
Complete - - - - - - - - - - - - - - -	$20 00	25 00	30 00

BROODER GAS PACKER

Fig 2891

Does not require any pipe below it. Can be anchored at any point desired. To expand the rubber the tubing is turned to the right; to release packer, turn to the left.

REVISED LIST

Size of tubing, inches	Size of hole, inches	Length of rubber, inches	Weight, lbs.	Complete	PARTS	
					Rubber only	Frame only
2	4 7/8, 5	12	32	$23 50	8 00	15 50
2	5 5/8	12	40	25 00	9 00	16 00
2	5 5/8	15	45	28 00	10 00	18 00
2	6 1/4	12	51	27 50	10 50	17 00
2	6 1/4	15	57	30 00	11 00	19 00
2	6 5/8	15	60	30 00	11 00	19 00
2	7 3/8	15	65	40 00	15 00	25 00
3	5 5/8	12	60	25 00	9 00	16 00
3	5 5/8	15	67	28 00	10 00	18 00
3	6 1/4	15	70	30 00	11 00	19 00
3	7 3/8	15	88	40 00	15 00	25 00
4	8	15	--	45 00	18 00	27 00
5 5/8	8	15	--	45 00	18 00	27 00

For ball bearings on above up to 6 5/8-inch hole, $5.00 extra.
For ball bearings above 6 5/8-inch hole, $6.00 extra.

WELL PACKERS

BOTTOM HOLE PACKER
Fig. 2914

DISC CAVE PACKER
Fig. 2909

DISC WALL PACKER
Fig. 2906

For list and descriptions see page 290.

For list and description see page 291.

OIL PACKER
Fig. 2903

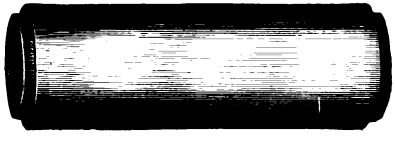
Packs by weight of casing

SELF-SUPPORTING WALL PACKER

Size of tubing, inches	Size of hole, inches	Weight, lbs.	Complete	Rubbers only
2 or 2½	4, 4¼ or 4½	40 to 42	$35 00	6 00
3 or 3½	4¾, 4⅞, 5, 5 3/16	49 to 54	35 00	8 00
3½, 4¼ or 4½	5½ or 5⅝	43 to 51	35 00	8 00
4¼, 4½ or 4¾	6	50 to 58	40 00	8 00
4¼, 4½ or 4¾	6⅛ or 6¼	54 to 66	45 00	8 00
4¼, 4½ or 4¾	6½ or 6⅝	57 to 68	50 00	10 00
5 or 5 3/16	6½ or 6⅝	57 to 68	50 00	10 00
5⅝	7½, 7⅝ or 8	100 to 113	65 00	10 00
6	8	84	70 00	10 00
6¼ or 6⅝	8 or 8¼	82 to 90	75 00	10 00
7½ or 8¼	10	140	100 00	-----
8¼ or 10	12	----	125 00	-----

PACKER RUBBER

Fig. 2916



WELL PACKERS

STANDARD LIST

ADOPTED BY THE PACKER MANUFACTURERS, OCTOBER 10, 1907

BOTTOM HOLE PACKERS

Fig. 2914, page 289

Size of Casing, Inches	Size of Hole, Inches	Length of Rubber, Inches	Price of Rubber	Price, Complete
4¼ or 4½	5⅝	10	$5 00	$15 00
4¼ or 4½	6 or 6¼	10	6 00	18 00
4⅞	6¼ or 6⅝	10	6 00	18 00
5 3/16	6⅝	10	6 00	18 00
5⅜	7½ or 7⅞	10	9 00	25 00
5⅝	8 or 8¼	10	10 00	28 00
6 or 6¼	8 or 8¼	10	9 00	25 00
6⅜	8 or 8¼	10	9 00	25 00
6, 6¼ or 6⅝	8⅝	10	15 00	38 00
6¼ or 6⅝	10	13	18 00	50 00
7⅝	9⅝	13	18 00	45 00
8 or 8¼	10	13	18 00	45 00
9⅝	11⅝	13	24 00	70 00
10	13	13	27 00	80 00

LARGER PACKERS MADE TO ORDER

These prices are for Packers with shoe on bottom. The shoe is a support for the packer and prevents the shell from collapsing. Used on lower end of a string of casing that cannot be made tight in the ordinary way.

For threads on lower end of 4¼″ to 6⅝″ packers, add to list price $2.00 each.
For threads on lower end of 7⅝″ to 8¼″ packers, add to list price $4.00 each.
For Packers with Rubbers longer than 10″ up to and including 6⅝″ hole, add $1.00 per inch.
For 7⅝″ to 8¼″ inclusive, add $1.50 per inch.
For Rubbers only longer than 10″ up to and including 6⅝″ hole, add 75 cents per inch.
For 7⅝″ to 8¼″ inclusive, add $1.00 per inch.

DISC CAVE PACKERS

Fig. 2909, page 289

Size of Casing, Inches	Size of Hole, Inches	Price of Packer
3½, 4¼, 4⅞	4⅞, 5⅝, 6¼	$20 00
5 3/16	6⅝	22 00
5⅜	7⅞	28 00
5⅝, 6¼, 6⅝	8 or 8¼	32 00

These Packers are used to shut off dry caves, requiring only enough casing to cover the cave. Wells can be drilled deeper or cleaned out through these Packers.

Letting-in Tool, 3½ to 5 3/16″ inclusive, each - - - - - - - - $3 00
Letting-in Tool, 5⅜ to 6⅝″ inclusive, each - - - - - - - - - - 5 00

The above lists apply to Bottom Hole Packers and Cave Packers manufactured by

Larkin & Co.
Larkin Bros.
Spang & Co., Ltd.
T. W. Phillips Mfg. Co.
C. M. Heeter, Sons & Co.
Parkersburg Machine Co.
B. Masseth Estate.
Oil Well Supply Co.

WELL PACKERS.

DISC WALL PACKERS.

Fig. 2906, page 289.

Size of Tubing Inches	Size of Hole Inches	Length of Rubber, in.	Price of Rubber	Price of Packer Complete
2, 2½, 3, 3½	4¼, 4½, 4⅝, 4⅞	10	$4 00	$18 00
2, 2½, 3, 3½	5 3/16, 5½, 5⅝	10	5 00	18 00
4, 4¼	5½, 5⅝	10	5 00	17 00
4½	5½, 5⅝	10	5 00	18 00
2, 2½, 3, 3½	6, 6¼, 6⅝	10	6 00	21 00
4, 4¼, 4½, 4⅞, 5 3/16	6, 6¼, 6⅝	10	6 00	20 00
2, 2½, 3, 3½, 4, 4¼, 4½, 5	7½ or 7⅝	10	9 00	34 00
5⅝	7½ or 7⅝	10	9 00	32 00
2, 2½, 3, 3½, 4, 4¼, 4½, 5	8 or 8¼	10	10 00	34 00
5⅝	8 or 8¼	10	10 00	32 00
6¼, 6⅝	8 or 8¼	10	9 00	32 00
7⅝	10	13	20 00	60 00
8	10	13	18 00	60 00
10	13	16	30 00	100 00

For Packers with longer Rubbers than 10″ up to and including 6⅝″ hole, add $1.00 per inch. For 7⅝″ to 8¼″ inclusive, add $1.50 per inch.

For Rubbers only longer than 10″ up to and including 6⅝″ add 75 cents per inch. For 7⅝ to 8¼″ inclusive, add $1.00 per inch.

DISC WALL PACKER PARTS.

Size Inches	Size Hole Inches	Collars	Cones	Slips	Springs	Bottom	Pipe	Discs
2, 2½	4, 4¼ or 4½	$2 00	$4 00	$3 00	$1 25	$2 00	$3 50	$0 25
2, 2½, 3, 3½	4⅝ or 4⅞	2 00	4 00	3 00	1 50	2 00	3 50	25
2, 2½, 3, 3½	5 3/16	2 00	4 00	3 00	1 50	2 00	3 50	25
2, 2½, 3, 3½	5⅜	2 50	4 00	3 00	2 00	2 00	3 50	25
4, 4¼	5⅝	2 00	4 00	3 00	2 00	2 00	3 50	25
2, 2½, 3	6, 6¼ or 6½	2 50	4 00	3 50	2 00	2 00	4 00	25
3½, 4, 4¼	6, 6¼ or 6½	2 50	4 00	3 50	2 00	2 00	4 00	25
4½	6, 6¼ or 6½	2 50	4 00	3 50	2 00	2 00	4 00	25
2, 2½, 3, 3½	7½ or 7⅝	5 00	6 00	4 50	3 00	3 00	5 00	50
4, 4¼, 5, 5⅝	7½ or 7⅝	3 50	6 00	4 50	3 00	3 00	5 00	50
2, 2½, 3, 3½	8 or 8¼	5 00	6 00	5 00	3 00	3 00	5 00	50
4, 4½, 5, 5⅝	8 or 8¼	4 00	6 00	5 00	3 00	3 00	5 00	50
5 3/16	6⅝	2 50	4 00	3 50	2 00	2 50	4 00	25
6, 6¼	8 or 8¼	4 00	6 00	6 00	3 00	3 00	6 00	50
6⅝	8 or 8¼	4 00	6 00	6 00	3 00	3 00	6 00	50
7⅝	10	8 50	12 00	8 50	5 50	5 00	10 00	1 00
8	10	7 00	11 00	8 00	5 00	5 00	10 00	1 00

The above lists apply to Disc Wall Packers and Parts manufactured by

Larkin & Co.
Larkin Bros.
Spang & Co., Ltd.
T. W. Phillips Mfg. Co.
C. M. Heeter, Sons & Co.
Parkersburg Machine Co.
B. Masseth Estate.
Oil Well Supply Co.

GAS TANKS

THE O. W. S. CO. AUTOMATIC HIGH PRESSURE—Fig. 3188

Every tank tested to 200 lbs. pressure. This tank is positive in its action and can be cleaned without disconnecting from lead and flow lines. All working parts on outside and easy of access for removing mud or other obstructions from valves.

Size - - - - - inches	36 x 72	48 x 84
Thickness of shell, inches	$\frac{5}{16}$	$\frac{13}{32}$
Weight - - - - lbs.	**1,520**	**1,920**
Complete - - - - - -	$120 00	150 00

WILBUR'S AUTOMATIC LOW PRESSURE—Fig. 3185

Weight, 155 lbs.

Capacity, 3 barrels

Fig. 3185, with 2-inch connections - $25 00
Fig. 3185, with 2½-inch connections - 27 50

WASHINGTON AUTOMATIC

Size - inches	26 x 48	36 x 66	36 x 72	48 x 84
With valve and shut-off - -	$32 00	58 00	65 00	120 00

OIL STORAGE AND TRANSPORTATION

PORTABLE STEEL STORAGE TANK

CAPACITY	SIZE	WEIGHT	PRICE
70 barrels	8 ft. x8 ft.	2,750 lbs.	$152 00

These tanks are built of the best open hearth steel, $\frac{3}{16}$ inch thick. Bottoms and tops are flanged. They are equipped with a 16-inch nozzle on top, a 16-inch man-hole on the side, near bottom, a 2-inch flange on side, near bottom, for attaching pipe line, a 1-inch tap in bottom, close to the edge, for drawing off water. NOTE: This is the largest tank that can be conveniently handled in transportation, either by rail or wagon road. Four of these tanks can be loaded on an ordinary open freight car. The actual weight will closely approximate 12,000 pounds, or the minimum weight for this class, to which car lot rates may be applied.

Fig. 3018

Front view

OIL THIEF

Fig. 3018, 12 inch complete with leather case - - - - - $45 00
12 " " less " " - - - - - 35 00
24 " " " " " - - - - - 48 00

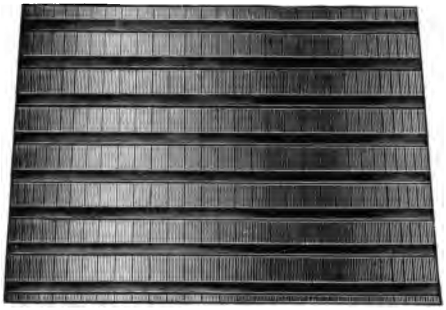
Fig. 3038

WATSON PATENT BARREL FILLER

Fig. 3038

Weight - 7.5 lbs.
Price - $25 00

OIL STORAGE AND TRANSPORTATION



WOODEN TANK

Fig. 3189

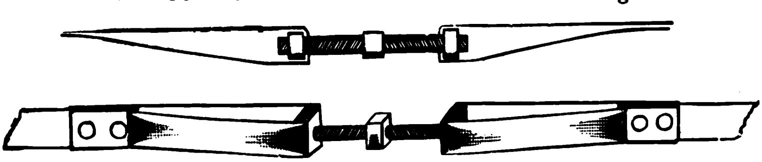
Made to order. Prices furnished on application.

42 gallons equal one barrel, standard oil measurement.

DIMENSIONS AND WEIGHTS

Diameter, feet	Length of staves, feet	Number of hoops	Capacity, gallons	Shipping weight, lbs.	Diameter, feet	Length of staves, feet	Number of hoops	Capacity, gallons	Shipping weight, lbs.
3	3	3	158	220	12	12	12	9,658	3,091
4	4	4	321	361	13	6	6	5,378	2,138
5	4	4	587	505	13	8	8	7,363	2,556
6	4	4	720	586	13	12	12	11,333	3,481
6	6	5	1,145	776	14	8	8	8,540	2,765
7	4	4	983	694	14	12	12	13,146	3,796
7	6	5	1,559	921	14	14	13	15,449	4,280
8	4	4	1,294	840	15	6	5	7,160	2,530
8	6	5	2,031	1,096	15	8	8	9,804	3,093
8	8	7	2,781	1,372	15	12	12	15,090	4,130
9	4	4	1,623	971	15	16	15	19,070	4,943
9	6	5	2,577	1,260	16	6	5	8,147	2,686
9	8	8	3,529	1,553	16	8	8	11,155	3,370
10	4	4	2,006	1,124	16	12	12	17,170	4,529
10	6	5	3,182	1,454	16	14	13	20,179	4 080
10	8	8	4,357	1,784	16	16	16	23,187	5,678
11	4	4	2,428	1,307	18	8	8	14,118	4,091
11	6	5	3,850	1,679	18	12	12	21,730	5,370
11	8	8	5,272	2,079	18	16	16	29,184	6,750
12	4	4	2,891	1,414	20	14	14	31,334	6,850
12	6	5	4,582	1,843	20	16	16	36,035	7,734
12	8	8	6,274	2,280	24	16	16	51,889	10,400
11	11	10	7,405	2,632	--	--	--	-- --	-----

TANK HOOP CONNECTION—WARE'S PATENT—Fig. 3197

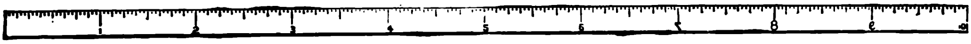


To tighten the hoops of wooden tanks

Complete - - - - $1 00 Bolt only - - - - $0 50 Straps only, per pair $0 50

GAUGE ROD—Fig. 3199

For measuring oil in tank



Per foot - $0 20

OIL STORAGE AND TRANSPORTATION

STEEL STORAGE TANK

Fig. 3191

SPECIFICATIONS OF STEEL TANKS

Ranging from 150 barrels to 35,000 barrels capacity, to hold either crude or refined petroleum. If tanks are required for water or liquids heavier than petroleum, heavier iron should be used.

SPECIFICATIONS OF OIL STORAGE TANKS

Capacity (barrels of 42 gallons each), about	150	200	250	300
Diameter - - - - - - - - - - - feet	9	14	14	14
Height - - - - - - - - - - - feet	14	8	10	12
Number of rings in shell - - - - - - - -	3	2	2	3
Thickness of first ring (B. W. G.) - - -	No. 7	No. 7	No. 7	No. 7
Thickness of second ring - - - - - - - -	No. 8	No. 8	No. 8	No. 8
Thickness of third ring - - - - - - - -	No. 8	-----	-----	No. 8
Thickness of bottom - - - - - - - - -	No. 8	No. 8	No. 8	No. 8
Size of bottom angle - - - - - - inches	2 x 2 x ¼	2 x 2 x ¼	2 x 2 x ¼	2 x 2 x ¼
Size of top angle - - - - - - - inches	2 x 2 x ¼	2 x 2 x ¼	2 x 2 x ¼	2 x 2 x ¼
Thickness of sheets for tight riveted roof	No. 12	No. 12	No. 12	No. 12

Capacity (barrels of 42 gallons each), about	350	400	500	------
Diameter - - - - - - - - - - - feet	14	18	18	------
Height - - - - - - - - - - - feet	14	9½	12	------
Number of rings in shell - - - - - - - -	3	2	3	------
Thickness of first ring (B. W. G.) - - - -	No. 7	No. 7	No. 6	------
Thickness of second ring - - - - - - - -	No. 8	No. 8	No. 7	------
Thickness of third ring - - - - - - - -	No. 8	-----	No. 8	------
Thickness of bottom - - - - - - - - -	No. 7	No. 7	No. 7	------
Size of bottom angle - - - - - - inches	2 x 2 x ¼	2½ x 2½ x 5/16	2½ x 2½ x 5/16	------
Size of top angle - - - - - - - inches	2 x 2 x ¼	2 x 2 x ¼	2 x 2 x ¼	------
Thickness of sheets for tight riveted roof -	No. 12	No. 12	No. 12	------

Capacity (barrels of 42 gallons each) - - about	1,000	2,000	3,000	4,000	5,000	10,000
Diameter - - - - - - - - - - - - feet	30	30	30	35	43	54
Height - - - - - - - - - - - - - feet	8	16	24	24	20	25
Number of rings in shell - - - - - - - - -	2	4	5	5	4	6
Thickness of first ring (B. W. G.) - - - - -	No. 7	No. 5	No. 3	No. 3	No. 3	No. 3
Thickness of second ring - - - - - - - - -	No. 8	No. 6	No. 4	No. 4	No. 4	No. 3
Thickness of third ring - - - - - - - - -	-----	No. 7	No. 5	No. 5	No. 5	No. 4
Thickness of fourth ring - - - - - - - - -	----	No 8	No. 6	No. 6	No. 6	No. 5

SPECIFICATIONS OF STEEL TANKS—Continued

Thickness of 5th ring	-----	-----	No. 7	No. 7	-----	No. 6
Thickness of 6th ring	-----	-----	-----	-----	-----	No. 7
Thickness of 7th ring	-----	-----	-----	-----	-----	-----
Thickness of bottom plates	No. 7	No. 7	No. 7	No. 7	No. 7	No. 7
Thickness of sketch plates	No. 7	No. 7	No. 7	No. 7	No. 7	No. 7
Side of bottom angle - inches	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{5}{16}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{5}{16}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{5}{16}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{3}{8}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{3}{8}$	$2\frac{1}{2}\times2\frac{1}{2}\times\frac{3}{8}$
Size of top angle - inches	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$
Thickness of sheets for light nailed roof	No. 20	No. 20	No. 20	No. 20	No. 20	No. 20
Thickness of sheets for tight riveted roof	No. 12	No. 12	No. 12	No. 12	No. 12	No. 12
Capacity, (barrels of 42 gallons each) - about	15,000	20,000	25,000	30,000	35,000	----------
Diameter - feet	66	78	86	86	92	----------
Height - feet	25	25	25	30	30	----------
No. of rings in shell	6	6	6	7	7	----------
Thickness of 1st ring (B. W. G.)	No. 3	No. 2	No. 1	No. 0	No. 00	----------
Thickness of 2d ring	No. 3	No. 3	No. 2	No. 1	No. 0	----------
Thickness of 3d ring	No. 4	No. 4	No. 3	No. 2	No. 1	----------
Thickness of 4th ring	No. 5	No. 5	No. 4	No. 3	No. 2	----------
Thickness of 5th ring	No. 6	No. 6	No. 5	No. 4	No. 3	----------
Thickness of 6th ring	No. 7	No. 7	No. 6	No. 5	No. 4	----------
Thickness of 7th ring	-----	-----	-----	No. 6	No. 6	----------
Thickness of bottom plates	No. 6	No. 6	No. 6	No. 6	No. 6	----------
Thickness of sketch plates	No. 6	No. 6	No. 6	No. 6	No. 5	----------
Size of bottom angle - inches	$3\times3\times\frac{3}{8}$	$3\times3\times\frac{3}{8}$	$3\times3\times\frac{3}{8}$	$4\times4\times\frac{1}{2}$	$4\times4\times\frac{1}{2}$	----------
Size of top angle - inches	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{1}{4}$	$2\times2\times\frac{3}{8}$	----------
Thickness of sheets for light nailed roof	No. 20	No. 20	No. 20	No. 20	No. 20	----------
Thickness of sheets for tight riveted roof	No. 12	No. 12	No. 12	No 12	No. 12	----------

Tanks are provided with a man-hole on the first ring, also an outlet flange, and tanks with roofs are provided with an additional man-hole on roof.

The above are "standard" specifications of steel tanks for storage purposes.

In rating the capacity of tanks, an allowance is made for the "deadwood" or timbers supporting the roof.

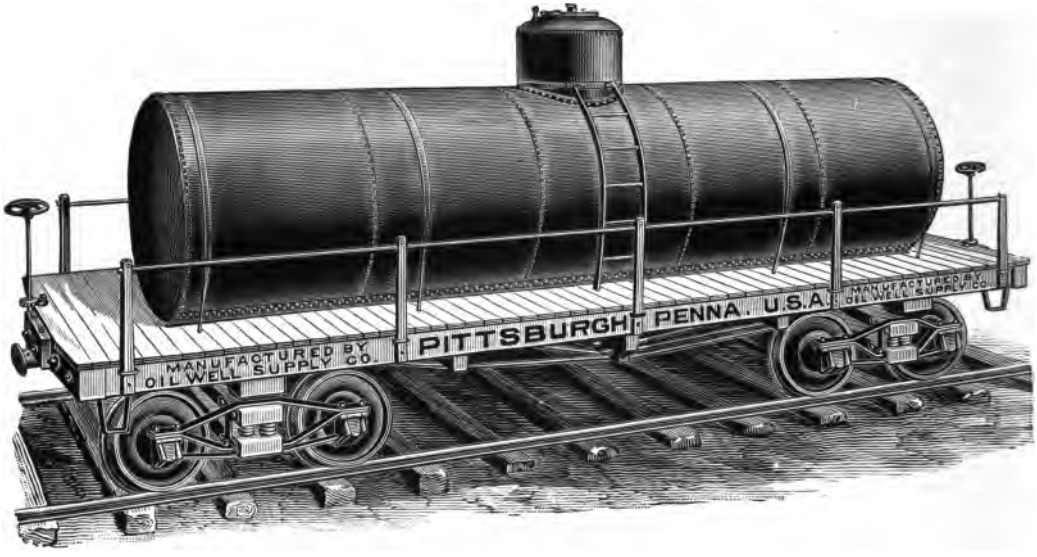
We furnish plans, specifications and estimates on iron or steel tanks of any size or style, for any purpose.

Any information in regard to this class of work will be cheerfully furnished. Prices on application.

OIL STORAGE AND TRANSPORTATION

TANK CAR

Fig. 3195



We furnish tank cars in any size with steel tanks from 4,000 to 6,600 gallons, mounted on trucks of 40,000 and 60,000 pounds carrying capacity, master car builders' standard, with air brakes. Prices furnished on specification.

STEEL SHIPPING DRUM

Fig. 3196

With heavy hoops for rolling

PLAIN—ASBESTOS PAINTED OUTSIDE

Capacity, gallons	DIMENSIONS OVER ALL		Weight, pounds	Price
	Diam. inches	Height, inches		
5⅛	11½	17½	17.7	$2 50
10¼	14	20¾	21	3 25
15⅝	15⅞	22¾	30	4 25
20⅛	17½	26¼	34.5	5 25
25½	18¾	28¾	41.5	6 25
30½	18⅜	29¾	36	7 25
GALVANIZED—INSIDE AND OUT				
5⅛	11½	17½	19	3 25
10¼	14	20¾	27	4 25
15⅝	15⅞	22¾	34	5 50
20⅛	17½	26¼	39.5	7 00
25½	18¾	28¾	48.5	8 50
30½	18⅜	29¾	36	9 50

BOTTLES FOR SAMPLES OF OIL

Fig. 5421

With mailing case

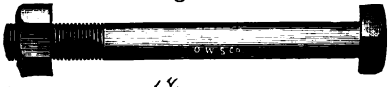
Capacity - - - - - - - - - - - - - ounces	1	2	4	8
Bottles only - - - - - - - - - - - per dozen	$0 60	60	75	1 10
Mailing cases only - - - - - - - - - per dozen	1 75	2 10	2 80	----
Corks - - - - - - - - - - - - - per gross	----	----	----	1 65

MANUFACTURERS' STANDARD LIST OF MACHINE BOLTS

With square heads and square nuts, finished points. Adopted September 20, 1899, to take effect October 1, 1899.

SQUARE NUT
Fig. 5546

HEXAGON NUT
Fig. 5544



Price per hundred

Length in inches	¼	5/16	⅜	7/16	½	9/16 & ⅝	¾	⅞	1	1⅛	1¼
¾ to 1½	$1 70	2 00	2 40	2 80	3 60	5 20	7 20	10 50	15 10	22 50	30 00
2	1 78	2 12	2 56	3 00	3 86	5 58	7 70	11 20	16 00	23 70	31 50
2½	1 86	2 24	2 72	3 20	4 12	5 96	8 20	11 90	16 90	24 90	33 00
3	1 94	2 36	2 88	3 40	4 38	6 34	8 70	12 60	17 80	26 10	34 50
3½	2 02	2 48	3 04	3 60	4 64	6 72	9 20	13 30	18 70	27 30	36 00
4	2 10	2 60	3 20	3 80	4 90	7 10	9 70	14 00	19 60	28 50	37 50
4½	2 18	2 72	3 36	4 00	5 16	7 48	10 20	14 70	20 50	29 70	39 00
5	2 26	2 84	3 52	4 20	5 42	7 86	10 70	15 40	21 40	30 90	40 50
5½	2 34	2 96	3 68	4 40	5 68	8 24	11 20	16 10	22 30	32 10	42 00
6	2 42	3 08	3 84	4 60	5 94	8 62	11 70	16 80	23 20	33 30	43 50
6½	2 50	3 20	4 00	4 80	6 20	9 00	12 20	17 50	24 10	34 50	45 00
7	2 58	3 32	4 16	5 00	6 46	9 38	12 70	18 20	25 00	35 70	46 50
7½	2 66	3 44	4 32	5 20	6 72	9 76	13 20	18 90	25 90	36 90	48 00
8	2 74	3 56	4 48	5 40	6 98	10 14	13 70	19 60	26 80	38 10	49 50
9	2 90	3 80	4 80	5 80	7 50	10 90	14 70	21 00	28 60	40 50	52 50
10	3 06	4 04	5 12	6 20	8 02	11 66	15 70	22 40	30 40	42 90	55 50
11	3 22	4 28	5 44	6 60	8 54	12 42	16 70	23 80	32 20	45 30	58 50
12	3 38	4 52	5 76	7 00	9 06	13 18	17 70	25 20	34 00	47 70	61 50
13	3 54	4 76	6 08	7 40	9 58	13 94	18 70	26 60	35 80	50 10	64 50
14	3 70	5 00	6 40	7 80	10 10	14 70	19 70	28 00	37 60	52 50	67 50
15	3 86	5 24	6 72	8 20	10 62	15 46	20 70	29 40	39 40	54 90	70 50
16	4 02	5 48	7 04	8 60	11 14	16 22	21 70	30 80	41 20	57 30	73 50
17	4 18	5 72	7 36	9 00	11 66	16 98	22 70	32 20	43 00	59 70	76 50
18	4 34	5 96	7 68	9 40	12 18	17 74	23 70	33 60	44 80	62 10	79 50
19	4 50	6 20	8 00	9 80	12 70	18 50	24 70	35 00	46 60	64 50	82 50
20	4 66	6 44	8 32	10 20	13 22	19 26	25 70	36 40	48 40	66 90	85 50
21	-----	----	----	----	-----	-----	26 70	37 80	50 20	69 30	88 50
22	-----	----	----	----	-----	-----	27 70	39 20	52 00	71 70	91 50
23	-----	----	----	----	-----	-----	28 70	40 60	53 80	74 10	94 50
24	-----	----	----	----	-----	-----	29 70	42 00	55 60	76 50	97 50
25	-----	----	----	----	----	-----	30 70	43 40	57 40	78 90	100 50
26	-----	----	----	----	-----	-----	31 70	44 80	59 20	81 30	103 50
27	-----	----	----	----	-----	-----	32 70	46 20	61 00	83 70	106 50
28	-----	----	----	----	-----	-----	33 70	47 60	62 80	86 10	109 50
29	-----	----	----	----	-----	-----	34 70	49 00	64 60	88 50	112 50
30	-----	----	----	----	-----	-----	35 70	50 40	66 40	90 90	115 50

The following extras are to be understood as a part of this list: Bolts with hexagon heads or hexagon nuts, 10 per cent extra. If both hexagon heads and hexagon nuts, 20 per cent extra. Joint bolts with oblong nuts 10 per cent, bolts with tee heads, askew heads and eccentric heads, 20 per cent extra. Key bolts, 20 per cent extra. Bolts with cotter holes, 25 per cent extra. Special bolts with irregular threads and unusual dimensions of heads or nuts will be charged extra at the discretion of the manufacturer. **For weights, see page 298.**

EYE BOLTS—Not illustrated

Diameter - - - - inches	⅝	¾	⅞	1	1⅛	1¼
12 inches long - - - - -	$1 20	1 25	1 30	1 35	1 45	1 65
14 inches long - - - - -	1 25	1 30	1 35	1 40	1 55	1 75
16 inches long - - - - -	1 30	1 35	1 40	1 45	1 65	1 85
18 inches long - - - - -	1 35	1 40	1 45	1 50	1 75	2 00

AVERAGE WEIGHT OF MACHINE BOLTS, WITH SQUARE NUTS, POUNDS PER 100

Length, inches	DIAMETER, INCHES									
	¼	5/16	3/8	7/16	½	9/16	5/8	¾	⅞	1
1½	3.9	6.2	9.7	14.7	20.4	26	37	58	---	---
2	4.6	7.2	11.3	16.5	22.4	29	40	63	98	145
2½	5.4	8.2	13	18.5	25	32	44	69	106	153
3	6.2	9.3	14.5	20.5	28	35	48	75	114	163
3½	6.9	10.4	16	22.6	31	39	53	81	122	174
4	7.6	11.5	17.7	25	33.5	42	58	88	130	185
4½	8.3	12.6	19.2	27	36	45	61	94	138	196
5	9	13.7	21	29	39	49	65	100	147	207
5½	9.7	14.8	22.2	31	42	52	69	106	155	218
6	10.4	16	23.7	33	45	55	73	112	163	229
6½	11	17	25	35	47	59	78	118	172	240
7	11.8	18	27	37	50	62	82	124	180	251
7½	12.5	19	28	39	53	65	86	131	187	262
8	13.2	20.3	30	42	56	69	90	137	195	273
9	----	----	33	46	62	75	98	149	212	295
10	----	----	37	50	67	82	106	161	229	317
11	----	----	40	54	73	89	115	173	246	339
12	----	----	43.5	58	78	96	123	184	263	361
13	----	----	----	----	84	102	131	197	280	383
14	----	----	----	----	89	109	140	209	297	405
15	----	----	----	----	95	116	148	221	314	427
16	----	----	----	----	100	123	157	233	331	449
17	----	----	----	----	106	130	165	245	348	471
18	----	----	----	----	111•	137	174	258	365	493
19	----	----	----	----	117	144	182	270	382	515
20	----	----	----	----	122	151	191	282	399	537
21	----	----	----	----	----	---	198	294	416	559
22	----	----	----	----	----	---	206	306	437	581
23	----	----	----	----	----	---	215	318	454	603
24	----	----	----	----	----	---	224	330	470	625

AVERAGE WEIGHT OF COACH OR LAG SCREWS, POUNDS PER 100

Length, inches	DIAMETER, INCHES								
	5/16	3/8	7/16	½	9/16	5/8	¾	⅞	1
1½	4.2	6.5	9.2	13	----	----	---	---	---
1¾	4.7	7.1	10	13.8	----	----	---	---	---
2	5.2	7.7	10.9	14.9	23	24.8	---	---	---
2¼	5.7	8.4	11.8	16	24.5	27.3	---	---	---
2½	6 2	9.2	12.7	17.4	26	29	43	---	---
3	7.2	10.6	14.6	19	29.2	33	48	75	---
3½	8.2	12	16.6	21.5	32.5	36.9	54	79	90
4	9.2	13.5	18.8	24	36	41	60	82	99
4½	10.2	15	20.7	26.5	39	45	66	86	108
5	11.3	16.5	22.8	29	43	49	72	90	118
5½	12.4	18	25	31.5	46	53	78	98	128
6	13.5	19.5	27	34	50	57	84	106	138
7	----	----	31	39	56	65	96	123	158
8	----	----	35	44	63	73	108	139	178
9	----	----	----	49	70	81	120	156	198
10	----	----	----	54	77	89	131	172	219
11	----	----	----	----	83	97	143	189	240
12	----	----	----	----	91	105	155	205	261

CARRIAGE BOLTS

MANUFACTURERS' LIST

Fig. 5552

PRICE PER HUNDRED

Adopted January 22, 1902, to take effect February 1, 1902.

Length	¼	5/16	3/8	7/16	½	9/16 and 5/8	¾
1½	$1 00	1 20	1 60	2 20	----	----	----
1¾	1 04	1 25	1 68	2 29	----	----	----
2	1 08	1 30	1 76	2 38	----	----	----
2¼	1 12	1 35	1 84	2 47	----	----	----
2½	1 16	1 40	1 92	2 56	3 00	5 20	7 20
2¾	1 20	1 45	2 00	2 65	3 11	5 37	7 43
3	1 24	1 50	2 08	2 74	3 22	5 54	7 66
3¼	1 28	1 55	2 16	2 83	3 33	5 71	7 89
3½	1 32	1 60	2 24	2 92	3 44	5 88	8 12
3¾	1 36	1 65	2 32	3 01	3 55	6 05	8 35
4	1 40	1 70	2 40	3 10	3 66	6 22	8 58
4¼	1 44	1 75	2 48	3 19	3 77	6 39	8 81
4½	1 48	1 80	2 56	3 28	3 88	6 56	9 04
4¾	1 52	1 85	2 64	3 37	3 99	6 73	9 27
5	1 56	1 90	2 72	3 46	4 10	6 90	9 50
5½	1 64	2 00	2 88	3 64	4 32	7 24	9 96
6	1 72	2 10	3 04	3 82	4 54	7 58	10 42
6½	1 80	2 20	3 20	4 00	4 76	7 92	10 88
7	1 88	2 30	3 36	4 18	4 98	8 26	11 34
7½	1 96	2 40	3 52	4 36	5 20	8 60	11 80
8	2 04	2 50	3 68	4 54	5 42	8 94	12 26
8½	2 12	2 60	3 84	4 72	5 64	9 28	12 72
9	2 20	2 70	4 00	4 90	5 86	9 62	13 18
9½	2 28	2 80	4 16	5 08	6 08	9 96	13 64
10	2 36	2 90	4 32	5 26	6 30	10 30	14 10
11	2 52	3 10	4 64	5 62	6 74	10 98	15 02
12	2 68	3 30	4 96	5 98	7 18	11 66	15 94
13	2 84	3 50	5 28	6 34	7 62	12 34	16 86
14	3 00	3 70	5 60	6 70	8 06	13 02	17 78
15	3 16	3 90	5 92	7 06	8 50	13 70	18 70
16	3 32	4 10	6 24	7 42	8 94	14 38	19 62
17	3 48	4 30	6 56	7 78	9 38	15 06	20 54
18	3 64	4 50	6 88	8 14	9 82	15 74	21 46
19	3 80	4 70	7 20	8 50	10 26	16 42	22 38
20	3 96	4 90	7 52	8 86	10 70	17 10	23 30

BOLT ENDS

With square nuts

Size of iron, inches	Length, inches	Price, per lb.	Size of iron, inches	Length, inches	Price, per lb.
--	--	$.--	1¼	14	$0 11
¼	6	25	1⅜	15	11
5/16	6	20	1½	16	11
⅜	7	18	1⅝	17	12
7/16	7	16	1¾	18	12
½ and 9/16	8	14	1⅞	19	12
⅝	9	12	2	20	12
¾	10	10	2¼	22	14
⅞	11	10	2½	24	14
1	12	10	--	--	--
1⅛	13	10	--	--	--

DOUBLE END BOLTS

Same list as machine bolts

Fig. 5548

COACH OR LAG SCREWS

MANUFACTURERS' LIST

Fig. 5554

With square heads. Adopted Sept. 20, '99, to take effect Oct. 1, '99

PRICE PER HUNDRED

Length in inches	5/16	⅜	7/16	½	9/16 and ⅝	¾	⅞	1
1½	$2 25	2 70	3 15	3 75	----	----	----	----
2	2 45	2 96	3 47	4 11	5 00	----	----	----
2½	2 65	3 22	3 79	4 47	5 50	7 90	----	----
3	2 85	3 48	4 11	4 83	6 00	8 60	12 50	----
3½	3 05	3 74	4 43	5 19	6 50	9 30	13 50	18 20
4	3 25	4 00	4 75	5 55	7 00	10 00	14 50	19 50
4½	3 45	4 26	5 07	5 91	7 50	10 70	15 50	20 80
5	3 65	4 52	5 39	6 27	8 00	11 40	16 50	22 10
5½	3 85	4 78	5 71	6 63	8 50	12 10	17 50	23 40
6	4 05	5 04	6 03	6 99	9 00	12 80	18 50	24 70
6½	----	----	6 35	7 35	9 50	13 50	19 50	26 00
7	----	----	6 67	7 71	10 00	14 20	20 50	27 30
7½	----	----	6 99	8 07	10 50	14 90	21 50	28 60
8	----	----	7 31	8 43	11 00	15 60	22 50	29 90
9	----	----	7 95	9 15	12 00	17 00	24 50	32 50
10	----	----	----	9 87	13 00	18 40	26 50	35 10
11	----	----	----	10 59	14 00	19 80	28 50	37 70
12	----	----	----	11 31	15 00	21 20	30 50	40 30

Average weights per 100, page 298

NUTS, SQUARE AND HEXAGON

UNITED STATES GOVERNMENT STANDARD SIZE

U. S. STANDARD SIZES				Hot pressed, Square, price per pound		Hot pressed, Hexagon, price per pound		Cold punched, chamfered and trimmed, price per pound — SQUARE		Cold punched, chamfered and trimmed, price per pound — HEXAGON	
Size of Square	Thick	Hole	Size of Bolt	Blank	Tapped	Blank	Tapped	Blank	Tapped	Blank	Tapped
1/2	1/4	9/16	1/4	$0 13	15	20	22.5	20	22	27	29.5
19/32	5/16	1/4	5/16	12	13.5	18	20	18	19.5	24	26
11/16	3/8	19/64	3/8	10.5	11.6	14	15.6	14.5	15.6	18.5	20.1
25/32	7/16	11/32	7/16	10	10.9	13	14.3	14	14.9	18	19 3
7/8	1/2	13/32	1/2	9	9.7	11.2	12.2	11.3	12	14	15
31/32	9/16	29/64	9/16	9	9.6	11.2	12.1	11.3	11.9	14	14.9
1 1/16	5/8	33/64	5/8	8.7	9.2	10.5	11.2	10	10.5	12 5	13.2
1 1/4	3/4	5/8	3/4	8.5	8.9	10	10.6	9.7	10.1	11.4	12
1 7/16	7/8	47/64	7/8	8.4	8.8	9.9	10 5	9.6	10	11.1	11.7
1 5/8	1	27/32	1	8.4	8.8	9.9	10 5	9 6	10	11.1	11.7
1 13/16	1 1/8	15/16	1 1/8	8.4	8.8	9.9	10 5	9.6	10	11.1	11.7
2	1 1/4	1 1/16	1 1/4	8.4	8.8	9.9	10.5	10.1	10.5	11.5	12.1
2 3/16	1 3/8	1 5/32	1 3/8	8.5	9	10	10.7	10.3	10.8	12.0	12.7
2 3/8	1 1/2	1 9/32	1 1/2	8.8	9.4	10.3	11.1	10.7	11.3	12.6	13.4
2 9/16	1 5/8	1 13/32	1 5/8	9	9.7	10.5	11.4	11.1	11.8	13.2	14.1
2 3/4	1 3/4	1 1/2	1 3/4	9.3	10	10.8	11.7	11.5	12.2	14	14.9
2 15/16	1 7/8	1 5/8	1 7/8	9.5	10.3	11.0	12	12	12.8	14.5	15.5
3 1/8	2	1 23/32	2	9.7	10.6	11.2	12 3	12	12 9	14.5	15.6
3 5/16	2 1/8	1 13/16	2 1/8	10	11	11.7	12.9	12.5	13.5	15	16.2
3 1/2	2 1/4	1 15/16	2 1/4	10	11.1	11.7	13	12.5	13.6	15	16.3

For less than keg lots (200 lbs.) of a size, add 20 cents per cwt. for 100 lbs. or over.
50 " " " " less than 100 lbs.

SQUARE NUTS—HOT PRESSED

MANUFACTURERS' LIST

Fig. 5558

Amended January 17, 1899, to take effect February 1, 1899.
Revised January 1, 1906.

Short Diameter	Thickness	Hole	Size of bolt	PRICE PER 100 LBS.		WEIGHT, PER 1,000
				Blank	Tapped	Blank, lbs.
1/2	1/4	7/32	1/4	$13 00	15 00	13 1/2
5/8	5/16	9/32	5/16	11 50	13 00	25
3/4	3/8	11/32	3/8	10 00	11 10	46 1/2
7/8	7/16	25/64	7/16	9 20	10 10	75
1	1/2	7/16	1/2	8 70	9 40	111 1/2
1 1/8	9/16	1/2	9/16	8 60	9 20	146 1/2
1 1/4	5/8	9/16	5/8	8 50	9 00	218
1 1/2	3/4	21/32	3/4	8 40	8 80	397
1 3/4	7/8	25/32	7/8	8 30	8 70	609
2	1	7/8	1	8 30	8 70	284
2 1/4	1 1/8	31/32	1 1/8	8 30	8 70	952
2 1/2	1 1/4	1 3/32	1 1/4	8 30	8 70	1,886
2 3/4	1 3/8	1 9/16	1 3/8	8 50	9 00	2,439
3	1 1/2	1 5/16	1 1/2	8 70	9 30	3,226
3 1/4	1 5/8	1 7/16	1 5/8	8 90	9 60	4,166
3 1/2	1 3/4	1 9/16	1 3/4	9 20	9 90	4,762
3 3/4	1 7/8	1 11/16	1 7/8	9 40	10 20	5,882
4	2	1 13/16	2	9 60	10 50	7,697
4	2 1/8	1 7/8	2 1/8	9 70	10 70	------
4 1/4	2 1/4	2	2 1/4	9 90	11 00	------
4 1/4	2 3/8	2 1/8	2 3/8	10 10	11 30	------
4 1/2	2 1/2	2 1/4	2 1/2	10 30	11 60	------
4 3/4	2 3/4	2 7/16	2 3/4	10 80	12 20	------
5	3	2 11/16	3	11 30	12 80	------
5 1/2	3 1/4	2 15/16	3 1/4	12 00	13 60	------
6	3 1/2	3 1/8	3 1/2	13 00	14 70	------

For less than keg lots (200 lbs.) of a size, add—

20 cents per cwt. for 100 lbs. or over.

50 cents per cwt. for less than 100 lbs.

In ordering nuts other than U. S. Standard sizes, always give short diameter, thickness and size of hole wanted.

Fig. 5559

HEXAGON NUTS—HOT PRESSED

MANUFACTURER'S LIST

Amended January 17, 1899, to take effect February 1, 1899

Revised January 1, 1906.

Short Diameter	Thickness	Hole	Size of bolt	PRICE PER 100 LBS. Blank	PRICE PER 100 LBS. Tapped	WT. PER 1,000 Blank, lbs.
¼	¼	7/32	¼	$20 00	22 50	11
5/16	5/16	9/32	5/16	16 00	18 00	21
⅜	⅜	11/32	⅜	13 00	14 60	38
7/16	7/16	25/64	7/16	11 40	12 70	62½
1	½	7/16	½	10 50	11 50	93
1⅛	9/16	½	9/16	10 40	11 30	122
1¼	5/8	9/16	5/8	10 10	10 80	182
1⅜	¾	21/32	¾	9 90	10 50	259½
1⅝	7/8	25/32	7/8	9 80	10 40	423½
1¾	1	⅞	1	9 80	10 50	532
2	1¼	1 1/32	1⅛	9 80	10 50	885
2¼	1⅜	1 9/32	1¼	9 80	10 40	1,250
2½	1½	1 13/16	1⅜	10 00	10 70	1,818
2¾	1⅝	1 15/16	1½	10 20	11 00	2,381
3	1¾	1 7/16	1⅝	10 40	11 30	3,030
3¼	1⅞	1 9/16	1¾	10 70	11 60	3,846
3½	2	1 11/16	1⅞	10 90	11 90	4,545
3½	2	1 13/16	2	11 10	12 20	------
3¾	2⅛	1⅞	2⅛	11 40	12 60	------
3¾	2¼	2	2¼	11 60	12 90	------
4	2⅜	2⅛	2⅜	12 00	13 40	------
4¼	2½	2¼	2½	12 30	13 80	------
4½	2¾	2 7/16	2¾	13 00	14 60	------
4¾	3	2 11/16	3	13 50	15 20	------
5	3¼	2 13/16	3¼	14 50	16 30	------
5¼	3½	3⅛	3½	15 50	17 40	------

For less than keg lots (200 lbs.) of a size, add 20 cents per cwt. for 100 lbs. or over; 50 cents per cwt. for less than 100 lbs.

In ordering nuts other than U. S. Standard sizes, always give short diameter, thickness and size of hole wanted.

WROUGHT IRON WASHERS

Bolt size - - - inches	1/16	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
Weight, per 100 - lbs.	**.226**	**.72**	**.9**	**1.52**	**2.34**	**3.75**	**4.5**	**8.**	**10.**	**12.**	**16½**
Per pound - - - - -	$0 14	12 2	11.4	10.5	9.7	9.2	9.1	9.0	8.8	8.8	8.8

Bolt size - - - inches	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	-----	-----	-----
Weight, per 100 - lbs.	**20.**	**25.**	**31.**	**37.**	**41.**	**45.**	**50.**	**56.**	-----	-----	-----
Per pound - - - - -	$0 8.8	9 0	9.0	9.2	9 2	9.5	9.5	9.5	-----	-----	-----

Cast iron washers - per pound, $0 05

WOOD SCREWS—IRON, PER GROSS

List of July 22, 1903.

No. - -	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20
¾	$0 72	72	75	78	82	88	94	----	----	----	----	----	----	----	----	----	----
½	72	75	78	80	84	90	96	1 05	1 10	1 20	----	----	----	----	----	----	----
5/8	72	75	78	82	86	92	98	1 07	1 12	1 20	1 25	1 30	----	----	----	----	----
¾	75	78	82	85	90	95	1 00	1 10	1 15	1 25	1 35	1 50	1 65	1 80	----	----	----
⅞	78	82	85	90	94	1 00	1 05	1 15	1 25	1 35	1 45	1 55	1 75	2 00	----	----	----
1	80	84	87	92	98	1 05	1 10	1 20	1 30	1 40	1 60	1 70	2 00	2 50	2 70	2 80	3 50
1¼	88	92	98	1 05	1 10	1 15	1 20	1 30	1 40	1 55	1 70	1 90	2 15	2 50	2 75	3 30	4 00
1½	98	1 05	1 10	1 15	1 20	1 30	1 35	1 40	1 50	1 65	1 80	2 00	2 35	2 80	3 20	3 80	4 30
1¾	-----	----	1 30	1 35	1 45	1 50	1 55	1 60	1 70	1 80	2 00	2 25	2 60	2 90	3 50	4 00	4 50
2	-----	----	1 45	1 50	1 55	1 60	1 65	1 75	1 85	2 00	2 20	2 45	2 75	3 10	3 70	4 20	4 80
2¼	-----	----	1 55	1 60	1 65	1 75	1 85	1 95	2 05	2 20	2 35	2 65	3 10	3 50	3 85	4 55	5 30
2½	-----	----	1 90	2 00	2 10	2 20	2 30	2 40	2 50	2 60	2 70	2 90	3 30	3 65	4 20	4 70	5 80
2¾	-----	----	----	2 40	2 60	2 70	2 80	2 90	3 00	3 10	3 20	3 30	3 60	3 90	4 50	5 00	6 10
3	-----	----	----	2 95	3 00	3 05	3 10	3 15	3 20	3 30	3 40	3 50	3 80	4 20	4 80	5 50	6 50
3½	----	----	----	----	----	3 90	4 00	4 10	4 20	4 30	4 40	4 50	4 75	4 95	5 40	6 15	7 30

Length, inches

CAP SCREWS—SQUARE HEAD

Per 100

Diameter of head	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2
Length of head	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Diameter of screw	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length under head to extreme point 3/4	$3 00	3 25	3 75	4 50	5 70	.....	.....	.....	.....	.....	.....	.....
1	3 25	3 50	4 00	4 90	5 90	9 25	9 25	.....	.....	.....	.....	.....
1 1/4	3 50	3 75	4 25	5 30	6 50	9 50	9 50	12 50	.....	.....	.....	.....
1 1/2	3 75	4 00	4 50	5 70	7 10	10 00	10 00	13 50	18 40	.....	.....	.....
1 3/4	4 00	4 25	4 85	6 10	7 70	10 75	10 75	14 50	19 70	22 75	.....	.....
2	4 25	4 85	5 20	6 50	8 30	11 50	11 50	15 50	21 00	25 00	34 00	38 50
2 1/4	4 70	5 35	5 55	7 15	8 90	12 60	12 60	16 50	22 40	27 25	36 75	42 00
2 1/2	5 25	5 80	6 00	7 50	9 50	13 60	13 60	17 50	23 70	29 50	39 50	45 50
2 3/4	5 75	6 30	6 65	7 90	10 10	14 40	14 40	19 00	25 00	31 75	42 25	49 00
3	6 25	6 80	7 20	8 40	10 70	15 20	15 20	20 60	26 40	34 00	45 00	52 50
3 1/4	.....	.....	.....	9 15	11 50	16 00	16 00	22 10	28 20	36 25	47 75	56 00
3 1/2	.....	.....	.....	9 75	12 30	17 30	17 30	23 70	30 00	38 50	50 50	59 50
3 3/4	.....	.....	.....	10 50	13 10	18 60	18 60	25 30	31 80	40 75	53 25	63 00
4	.....	.....	.....	11 10	13 90	19 90	19 90	26 90	33 60	43 00	56 00	66 50
4 1/4	.....	.....	.....	.....	.....	.....	21 20	28 50	35 40	45 25	58 75	70 00
4 1/2	.....	.....	.....	.....	.....	.....	22 50	30 10	37 20	47 50	61 50	73 50
4 3/4	.....	.....	.....	.....	.....	.....	.....	31 70	39 00	49 75	64 25	77 00
5	.....	.....	.....	.....	.....	.....	.....	.....	40 80	52 00	67 00	80 50
Threads to inch	20	18	16	14	12	12	11	10	9	8	7	7
Add for each 1/4 inch	$0 40	50	60	70	80	1 30	1 30	1 60	1 80	2 25	2 75	3 50

CAP SCREWS—HEXAGON HEAD

Per 100

Diameter of head	7/16	1/2	9/16	5/8	3/4	13/16	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Length of head	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Diameter of screw	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length under head to extreme point 3/4	$3 00	3 25	3 75	4 50	5 70	.....	.....	.....	.....	.....	.....	.....
1	3 25	3 50	4 00	4 90	5 90	9 25	9 25	.....	.....	.....	.....	.....
1 1/4	3 50	3 75	4 25	5 30	6 50	9 50	9 50	12 50	.....	.....	.....	.....
1 1/2	3 75	4 00	4 50	5 70	7 10	10 00	10 00	13 50	18 40	.....	.....	.....
1 3/4	4 00	4 25	4 85	6 10	7 70	10 75	10 75	14 50	19 70	22 75	.....	.....
2	4 25	4 85	5 20	6 50	8 30	11 50	11 50	15 50	21 00	25 00	34 00	38 50
2 1/4	4 70	5 35	5 55	7 15	8 90	12 60	12 60	16 50	22 40	27 25	36 75	42 00
2 1/2	5 25	5 80	6 00	7 50	9 50	13 60	13 60	17 50	23 70	29 50	39 50	45 50
2 3/4	5 75	6 30	6 65	7 90	10 10	14 40	14 40	19 00	25 00	31 75	42 25	49 00
3	6 25	6 80	7 20	8 40	10 70	15 20	15 20	20 60	26 40	34 00	45 00	52 50
3 1/4	.....	.....	.....	9 15	11 50	16 00	16 00	22 10	28 20	36 25	47 75	56 00
3 1/2	.....	.....	.....	9 75	12 30	17 30	17 30	23 70	30 00	38 50	50 50	59 50
3 3/4	.....	.....	.....	10 50	13 10	18 60	18 60	25 30	31 80	40 75	53 25	63 00
4	.....	.....	.....	11 10	13 90	19 90	19 90	26 90	33 60	43 00	56 00	66 50
4 1/4	.....	.....	.....	.....	.....	.....	21 20	28 50	35 40	45 25	58 75	70 00
4 1/2	.....	.....	.....	.....	.....	.....	22 50	30 10	37 20	47 50	61 50	73 50
4 3/4	.....	.....	.....	.....	.....	.....	.....	31 70	39 00	49 75	64 25	77 00
5	.....	.....	.....	.....	.....	.....	.....	.....	40 80	52 00	67 00	80 50
Threads to inch	20	18	16	14	12	12	11	10	9	8	7	7
Add for each 1/4 inch	$0 40	50	60	70	80	1 30	1 30	1 60	1 80	2 25	2 75	3 50

Regular cap screws are soft and have ground heads.
Price of steel cap screws will be 25 per cent above the price of iron.
Standard V threads.

ROUGH STUD BOLTS

With U. S. standard chamfered and trimmed hexagon nut on one end.

Price per 100

Diameter		3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
No. of threads		16	14	13, 12	12	11	10	9	8	7	7
Length over all, inches.	1 1/2	$4 00	5 10	5 50	----	----	-----	-----	-----	-----	-----
	1 3/4	4 10	5 25	5 65	----	----	-----	-----	-----	-----	-----
	2	4 20	5 40	5 80	8 50	8 50	12 40	-----	-----	-----	-----
	2 1/4	4 30	5 55	5 95	8 75	8 75	12 70	-----	-----	-----	-----
	2 1/2	4 40	5 70	6 10	9 00	9 00	13 00	18 00	-----	-----	-----
	2 3/4	4 50	5 85	6 25	9 25	9 25	13 30	18 50	-----	-----	-----
	3	4 60	6 00	6 40	9 50	9 50	13 60	19 00	27 80	-----	-----
	3 1/4	4 70	6 15	6 55	9 75	9 75	13 90	19 50	28 40	-----	-----
	3 1/2	4 80	6 30	6 70	10 00	10 00	14 20	20 00	29 00	41 50	-----
	3 3/4	4 90	6 45	6 85	10 25	10 25	14 50	20 50	29 60	42 25	-----
	4	5 00	6 60	7 00	10 50	10 50	14 80	21 00	30 20	43 00	60 00
	4 1/2	5 25	6 90	7 30	11 00	11 00	15 40	22 00	31 40	44 50	62 50
	5	6 00	7 60	7 60	11 50	11 50	16 00	23 00	32 60	46 00	65 00
	5 1/2	7 25	8 00	8 00	12 00	12 00	16 60	24 00	33 80	47 50	67 50
	6	8 00	8 45	8 45	12 50	12 50	17 20	25 00	35 00	49 00	70 00
	7	----	----	----	13 60	13 60	18 60	27 00	37 50	52 00	75 50
	8	----	----	----	14 80	14 80	20 10	29 10	40 10	56 00	81 00
	9	----	----	----	-----	-----	21 60	31 20	42 80	60 50	86 00
	10	----	----	----	-----	-----	23 20	33 40	45 50	65 00	92 00

IRON SET SCREWS—MILLED—SQUARE HEAD

Per 100

Diameter of screw - inches		1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length under head to extreme point.	3/4	$2 00	2 20	2 50	2 90	3 40	5 00	5 00	-----	-----	-----	-----	-----
	1	2 15	2 35	2 65	3 10	3 80	5 75	5 75	10 00	-----	-----	-----	-----
	1 1/4	2 30	2 50	2 85	3 50	4 30	6 50	6 50	11 00	15 50	-----	-----	-----
	1 1/2	2 50	2 70	3 10	4 00	4 80	7 25	7 25	12 00	16 20	22 00	-----	-----
	1 3/4	2 75	3 00	3 50	4 50	5 40	8 00	8 00	12 80	17 70	24 00	41 70	-----
	2	3 25	3 50	4 00	5 15	6 00	8 80	8 80	13 60	19 20	26 00	45 00	54 00
	2 1/4	3 75	4 00	4 50	5 75	6 75	9 60	9 60	14 50	20 70	28 00	48 30	58 30
	2 1/2	4 25	4 50	5 00	6 35	7 50	10 40	10 40	15 40	22 20	30 00	51 60	62 60
	2 3/4	4 75	5 00	5 50	6 75	8 25	11 20	11 20	16 30	23 70	32 00	54 90	66 90
	3	5 25	5 50	6 00	7 20	9 00	12 00	12 00	17 30	25 20	34 00	58 20	71 20
	3 1/4	-----	-----	-----	7 60	9 75	12 75	12 75	18 40	26 70	36 00	61 50	75 50
	3 1/2	-----	-----	-----	8 00	10 50	13 50	13 50	19 50	28 20	38 00	64 80	79 80
	3 3/4	-----	-----	-----	8 50	11 25	14 30	14 30	20 75	29 70	40 00	68 10	84 10
	4	-----	-----	-----	9 00	12 00	15 10	15 10	22 00	31 20	42 00	71 40	88 40
	4 1/4	-----	-----	-----	-----	-----	-----	15 90	23 50	32 70	44 00	74 70	92 70
	4 1/2	-----	-----	-----	-----	-----	-----	16 70	25 00	34 20	46 00	78 00	97 00
	4 3/4	-----	-----	-----	-----	-----	-----	-----	26 50	35 70	48 00	81 30	101 30
	5	-----	-----	-----	-----	-----	-----	----	-----	37 20	50 00	84 60	105 60
Threads to inch		20	18	16	14	12	12	11	10	9	8	7	7
Add for each 1/4 inch		$0 50	60	70	80	90	1 10	1 10	1 50	1 70	2 25	3 30	4 30

Regular set screws are case hardened, have cup points, and the heads are same diameter as the body. Orders will be filled with these unless otherwise specified. All orders filled with V threads unless otherwise specified.

IRON RIVETS

SUCKER ROD—Fig. 5889

By the keg, per lb. $0.15½
Less than keg, per lb. .19½

TANK—Fig. 5890

By the keg, per lb. $0.16
Less than keg, per lb. .20

BAILER—Fig. 5891

By the keg, per lb. $0.15
Less than keg, per lb. .19

RIVETS NOT ILLUSTRATED

Copper - - - per lb. $0 50 Boiler, Burden's - per lb. 05 Boiler, Dover - per lb. 05

CUT NAILS

NATIONAL CARD OF EXTRAS

Adopted at New York, December 1, 1896. Use same card for steel wire nails.

COMMON FENCE, SHINGLE, TOBACCO, FLOORING AND COMMON BRADS

	Advances
20d and 60d	Base
10d and 16d	$0 05
8d and 9d	10
6d and 7d	20
4d and 5d	30
3d	45
2d	70

BARBED COMMON AND BARBED CAR NAILS

15 per cent advance over common.

CASING AND SMOOTH BOX

10d and larger	15
8d and 9d	25
6d and 7d	35
4d and 5d	50
3d	70
2d	1 00

Barbed box 15 cents advance over smooth nails.

SMOOTH FINISHING NAILS

10d and larger	25
8d and 9d	35
6d and 7d	45
4d and 5d	65
3d	85
2d	1 15

LINING NAILS

¾ inch	1 20
⅞ inch	1 00
1 inch	80

SLATING NAILS

2d	80
3d	60
4d	40
5d	40
6d	30

FINE NAILS

	Advance
2d	$1 00
3d, 1⅛ x 15	50
3d, extra fine, 1⅛ x 16	65

BARREL

¾ inch	1 00
⅞ inch	65
1 inch	60
1⅛ inch	60
1¼ inch	50
1⅜ inch	40
1½ inch	30

BARBED ROOFING

¾ inch	75
⅞ inch	65
1 inch	60
1⅛ inch	60
1¼ inch	55
1½ and 1¾ inch	45
2 inch	35

CLINCH NAILS

2d	1 05
3d	85
4d and 5d	65
6d and 7d	55
8d and 9d	45
10d to 20d	35

HINGE NAILS

4d	80
6d	70
8d	60
10d and larger	50

SPIKES

All sizes	10

BARBED DOWEL PINS

⅝ inch	$2 00	1⅛ inch	1 15
¾ inch	1 75	1¼ inch	1 00
⅞ inch	1 50	1⅜ inch	1 00
1 inch	1 25	1½ inch	1 00

LENGTH OF NAILS

Size	1d	2	3	4	5	6	7	8	9	10	12	16	20	30	40	50	60
Length - inches	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	5½	6

WOOD CASE PULLEY BLOCKS

Fig. 5289

Single

Fig. 5290

Double

Fig. 5291

Triple

DIMENSIONS, INCHES			IRON BUSHED						IMPROVED ROLLER BUSHED			NET EXTRA FOR GALVANIZED STRAPS		
Size sheave	Diam. rope	Size shell	Single	Weight, lbs.	Double	Weight, lbs.	Triple	Weight, lbs.	Single	Double	Triple	Single	Double	Triple
1¾ x ½ x 3/16	3/16	3	$0 70	.75	$1 30	1.5	$1 75	2	$1 10	2 00	2 90	04	06	10
2 x ½ x 3/16	3/16	3½	75	1	1 45	1.8	2 00	2.5	1 15	2 20	3 15	04	06	10
2¼ x 5/8 x 1/4	1/4	4	85	1.5	1 60	2.3	2 15	3.5	1 20	2 25	3 25	05	07	11
3 x ¾ x 5/16	5/16	5	90	2.5	1 75	4.3	2 25	6	1 25	2 35	3 50	06	08	12
3½ x 1 x ½	½	6	1 10	4.3	2 00	7	2 90	10.5	1 50	2 85	4 40	10	12	15
4¼ x 1 x ½	½	7	1 30	6	2 40	8.5	3 50	13.5	1 70	3 35	5 00	12	15	18
4¾ x 1⅛ x 5/8	1	8	1 65	9	2 85	13	4 25	19	2 25	4 15	6 00	16	21	30
5¾ x 1⅛ x 5/8	1	9	1 85	12	3 40	17	4 75	25	2 50	4 70	7 25	22	28	38
6¼ x 1¼ x 5/8	1⅛	10	2 75	15.5	4 50	23.5	6 25	33	3 50	6 00	8 50	28	38	50
7½ x 1½ x ¾	1⅛	11	4 45	19	7 50	26	10 65	41	5 30	9 20	13 20	35	45	60
8 x 1⅜ x ¾	1¼	12	4 45	24	7 50	36	10 65	48	5 30	9 20	13 20	35	45	60
9 x 1½ x ¾	1¼	13	7 00	30	10 50	43	15 00	60	8 15	12 80	18 45	55	75	1 00
9½ x 1⅝ x ⅞	1⅜	14	7 00	38	10 50	58	15 00	80	8 15	12 80	18 45	55	75	1 00
10 x 1⅝ x ⅞	1½	15	8 00	40	13 00	62	18 00	84	9 25	15 50	21 75	75	95	1 25
11 x 1¾ x ⅞	1⅝	16	10 00	54	15 00	77	22 00	115	11 50	18 00	26 50	85	1 20	1 50

STEEL PULLEY BLOCKS

THE "HARTZ" PATENT

Fig. 5312

Fig. 5313

Fig. 5314

Size of rope, inches	Length of shell, inches	Single	Weight, lbs.	Double	Weight, lbs.	Triple	Weight, lbs.
½	4	$0 85	2	$1 60	3	2 15	5
5/8	5	90	3	1 75	5	2 25	7
¾	6	1 10	4	2 00	8	2 90	10
7/8	7	1 30	7	2 40	12	3 50	15
1	8	1 65	10	2 85	17	4 25	20
1⅛	9	1 85	12	3 40	20	4 75	27
1¼	10	2 75	17	4 50	27	6 25	33
1⅜	12	4 45	25	7 50	38	10 65	49
1½	14	7 00	33	10 50	52	15 00	65

WROUGHT IRON PULLEY BLOCKS

Fig. 5303

Single

Fig. 5304

Double

Fig. 5305

Triple

DIMENSIONS, INCHES				IRON BUSHED						PHOSPHOR BRONZE OR METALINE BUSHED, SELF-LUBRICATING		
Size sheave	Diam. rope	For chain	Size shell	Single	Weight, lbs.	Double	Weight, lbs.	Triple	Weight, lbs.	Single	Double	Triple
3½x1	¾	--	6	$2 35	4.5	3 75	7.5	4 60	9.5	3 35	5 75	7 60
4¼x1	⅞	--	7	3 10	6.5	4 60	10	5 85	13.5	4 35	7 10	9 60
4¾x1⅛	1	--	8	4 00	8.5	5 85	13.5	7 50	19	5 25	8 35	11 25
5 x1 5/16	1⅛	¼	9	5 35	12.5	8 20	17	10 50	25	6 85	11 20	15 00
6 x1½	1¼	5/16	10	6 20	17.5	10 50	30	13 50	38	7 85	13 80	18 50
7 x1⅝	1½	⅜	12	7 60	25	13 50	43	17 25	58	9 45	17 20	22 80
8 x1⅞	1¾	7/16	14	10 50	40	20 00	65	27 00	90	12 60	24 20	33 30
9 x2¼	2	9/16	16	16 70	60	27 50	97	38 50	130	19 20	32 50	46 00
10 x2⅜	2¼	9/16	18	28 50	78	43 00	133	58 50	182	31 75	49 50	68 25
11 x2⅝	2½	⅝	20	38 60	121	58 50	189	86 00	275	42 00	65 30	96 20

For list on quadruple blocks, add the list for single and triple together.

Fig. 5315

STEEL AUTOMATIC LOCK SNATCH BLOCKS

Fig. 5316

Length of strap, inches	Size of sheave, inches	Diameter of rope, inches	Weight, lbs.	With plain bushings	Self-lubricating graphite bronze bushings
7	3½ x 1¼	¾, ⅞	6	$4 75	$5 50
8	4 x 1½	1, 1⅛	10	5 75	7 00
10	5½ x 1⅞	1¼, 1⅜	17	8 50	10 00
12	7 x 2	1½, 1⅝	27	10 00	11 50
14	8 x 2¼	1¾, 1⅞	42	13 00	15 00
16	9 x 2½	2, 2¼	53	17 00	20 00

MALLEABLE IRON PULLEY BLOCKS

WITH LOOSE HOOKS

Fig. 5300

Fig. 5301

Fig. 5302

Size of rope, inches	Length of shell, inches	FIG. 5300		FIG. 5301		FIG. 5302	
		Single	Weight, lbs.	Double	Weight, lbs.	Triple	Weight, lbs.
1/2	4	$0 90	1.7	$1 75	2.5	$2 50	3.7
5/8	5	1 00	3	1 90	4	2 75	5.5
3/4	6	1 25	4.5	2 25	6	3 25	7.5
7/8	7	1 50	6.5	2 70	9.5	4 00	13.5
1	8	1 85	9.3	3 20	14	4 75	20
1 1/16	9	2 40	12	4 00	17.5	5 50	24
1 1/8	10	3 10	16	5 10	26	7 00	32
1 1/4	12	5 00	24	8 25	32	11 75	50
1 1/2	14	7 50	33	11 75	48	16 50	68

MALLEABLE IRON LOCK SNATCH BLOCKS

Fig. 5320

Fig. 5321

DIMENSIONS, INCHES			Plain bushed, price	Self-lubricating phos. bronze bushed, price	Ball bearing, price	Weight, lbs.
Length of shell	Size of sheave	Diameter of rope				
7	3 1/2 x 1 1/4	3/4 to 7/8	$4 75	5 50	5 50	7
8	4 x 1 1/2	1 to 1 1/8	5 75	7 00	7 00	11
10	5 1/2 x 1 7/8	1 1/4 to 1 3/8	8 50	10 00	10 00	18
12	7 x 2	1 1/2 to 1 5/8	10 00	11 50	11 50	27
14	8 x 2 1/4	1 3/4 to 1 7/8	13 00	15 00	15 00	40
16	9 x 2 1/2	2 to 2 1/4	17 00	20 00	20 00	53

WOOD SNATCH BLOCK WITH DROP LINK.

IRON STRAPPED.

Fig. 5293.

Size of Sheave Inches	For Diameter Rope Inches	Length of Shell Inches	Weight lbs.	Common Iron Bushed Each	Patent Roller, Bushed Each	Self-lubricating Metaline or Bronze Bushed Each
3 x 1⅛ x ½	⅞	6	6	$4 00	$4 65	$5 25
3½ x 1¼ x ½	⅞	7	8½	4 75	5 50	6 00
4½ x 1⅜ x ⅝	1	8	12	5 75	6 60	7 25
5 x 1⅝ x ⅝	1⅛	9	15	6 75	7 75	8 50
5¾ x 1⅞ x ¾	1¼	10	21½	8 50	10 00	11 00
6¾ x 2⅛ x ¾	1½	12	31	10 00	11 50	13 00
8 x 2¼ x ⅞	1¾	14	44	13 00	15 00	16 50
9 x 2⅝ x 1	2	16	83	17 00	20 00	22 00
10 x 3 x 1	2¼	18	89	25 00	28 50	31 00
11 x 3½ x 1¼	2½	20	128	38 00	43 00	46 00
11¾ x 4¼ x 1½	3	22	174	55 00	63 00	68 00
12½ x 4½ x 1½	3½	24	230	70 00	78 00	86 00
14 x 4¾ x 1¾	4	26	.....	90 00	.....	110 00

"HARTZ" DERRICK AND HOISTING BLOCKS FOR WIRE ROPE

Fig. 5317

Fig. 5318

Length of shell, inches	Size of sheave, inches	Diameter of rope, inches	Single	Weight, lbs.	Double	Weight, lbs.	Triple	Weight, lbs.
12	9½ x 1½ x ¾	⅜ or ½	$6 50	28	$12 00	43	$18 00	56
13	10½ x 1⅝ x ⅞	½ or ⅝	8 00	36	15 00	56	22 00	75
16	12 x 2 x 1	⅝ or ¾	10 00	53	19 00	86	27 00	125
18	14 x 2⅛ x 1	⅞ or 1	15 00	74	24 00	120	36 00	170

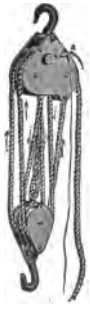
SURE GRIP STEEL TACKLE BLOCKS

Fig. 5325

Representing Nos. 3, 4, 5, and 6

No.	Size rope to use, inches	One man can lift, lbs.	Capacity, lbs.	Price
3	⅜	300	600	$3 00
4	½	350	1,000	5 50
5	⅝	400	1,800	7 00
6	¾	450	2,500	8 50
4½	½	600	3,000	10 00
5½	⅝	700	3,500	12 00
6½	¾	850	5,000	14 00

Fig. 5326



Representing Nos. 4½, 5½, and 6½

JACK SCREWS

Figs. 1932-1933

Diameter of screw, inches	Height of stand, inches	Lifting capacity, tons	Weight, pounds	Price	Diameter of screw, inches	Height of stand, inches	Lifting capacity, tons	Weight, pounds	Price
1⅛	6	8	..	$2 90	2	20	20	47	$11 50
1⅛	8	8	..	3 25	2	22	20	49	12 50
1⅛	10	8	..	3 60	2	24	20	58	13 50
1⅛	12	8	..	4 00	2¼	8	24	26	7 50
1⅛	14	8	..	4 40	2¼	10	24	29	8 25
1¼	6	10	9	3 10	2¼	12	24	34	9 00
1¼	8	10	11	3 40	2¼	14	24	37	10 00
1¼	10	10	13	3 80	2¼	16	24	41	11 00
1¼	12	10	16	4 20	2¼	18	24	43	12 00
1¼	14	10	17	4 60	2¼	20	24	52	13 25
1½	5	12	10	3 50	2¼	22	24	57	14 50
1½	6	12	12	3 75	2¼	24	24	66	15 75
1½	8	12	14	4 25	2½	6	28	24	7 75
1½	10	12	16	4 75	2½	6½	28	25	8 00
1½	12	12	19	5 25	2½	8	28	30	8 75
1½	14	12	22	6 00	2½	10	28	33	9 75
1½	16	12	24	6 75	2½	12	28	38	10 75
1¾	6	16	14	4 50	2½	14	28	43	12 00
1¾	8	16	17	5 00	2½	16	28	47	13 25
1¾	10	16	21	5 75	2½	18	28	55	14 50
1¾	12	16	25	6 25	2½	20	28	60	15 75
1¾	14	16	30	6 75	2½	22	28	64	17 00
1¾	16	16	31	7 50	2½	24	28	74	18 25
1¾	18	16	33	8 50	2½	28	28	83	22 00
2	5	20	15	5 00	2½	32	28	103	26 00
2	6	20	19	5 25	3	14	36	65	19 50
2	8	20	22	6 00	3	16	36	67	20 75
2	10	20	26	6 75	3	18	36	77	22 00
2	12	20	30	7 50	3	20	36	85	23 25
2	14	20	35	8 25	3	22	36	89	24 50
2	16	20	36	9 25	3	24	36	102	25 75
2	18	20	42	10 25					

BARRETT COMPOUND LEVER JACKS

DIMENSIONS AND PRICES

Fig. 1926

No.	Height with bar down, inches	Height with bar raised, inches	Size of bar, inches	Raise of bar, inches	Weight, pounds	Capacity, tons	Each
1—Trip	24	37½	1½ x 1½	13½	62	10	$18 00
2—A. L.	21	31	1⅝ x 1½	10	65	10	25 00
3—A. L.	26½	41½	1½ x 1⅝	15	85	12	30 00
4—A. L.	22	32	1⅝ x 2 1/16	10	100	15	35 00
5—A. L.	28	43	1⅝ x 2 1/16	15	115	15	40 00
6—Trip	31	50	1⅞ x 1⅝	19	105	15	32 00
8—A. L.	11	16	1⅝ x 1½	5	48	10	22 00
10—A. L.	24¼	38¼	1½ x 1½	14	66	10	25 00
12—Trip	17¾	25⅝	1½ x 1½	8	50	10	17 00
17—Trip	24	37¾	1½ x 1½	13¾	63	10	18 00
18—A. L.	21	31	1⅝ x 1½	10	68	10	25 00
19—A. L.	28	45½	1¾ x 1⅞	17½	102	15	35 00
20—Trip	31	50	1⅝ x 1⅞	19	106	15	32 00

HARDWARE

AXES

Fig. 5588

Single bit

Fig. 5589

Double bit

Weights, assorted, 3 to 4½ lbs.

Single bit - - - - - per dozen, $10 50
Double bit - - - - - per dozen, 15 00

BROAD AXE

Fig. 5591

Weights, 6 to 7 lbs. - per dozen, $32 00
Weights, 6½ to 7½ lbs. - per dozen, 32 00
Weights, 7 to 8 lbs. - per dozen, 35 00

HATCHETS

Fig. 5595

Broad

Fig. 5597

Half

Fig. 5593

Shingling

Fig. 5594

Oil King

No.	1	2	3	4
Broad, fig. 5595 - per dozen	$10 50	11 50	13 00	14 50
Broad, **weight** - **lbs.**	**1.5**	**1.7**	**2.1**	**2.5**
Half, common, fig. 5597 - per dozen	$8 00	8 50	9 00	-----
Half, solid steel, fig. 5597 - per dozen	10 00	11 00	12 00	-----
Half, **weight** - **lbs.**	**.9**	**1.3**	**1.7**	-----
Shingling, common, fig. 5593 - per dozen	$8 50	9 00	9 50	-----
Shingling, solid steel, fig. 5593 - per dozen	10 50	11 50	12 50	-----
Shingling, **weight** - **lbs.**	**1**	**1.7**	**1.8**	-----
Oil King, fig. 5594 - per dozen	-----	-----	$12 00	-----
Oil King, **weight** - **lbs.**	-----	-----	**1.8**	-----

HARDWARE

ADZE
Fig. 5600

Per dozen - - - - - - - - - $24 00

BUSH HOOK
Fig. 5800

No. 2, axe handle - - per dozen, $18 00

Fig. 5626

SOCKET FIRMER CHISEL

Size - - - - inches	⅛	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
Per dozen - - - - -	$11 00	11 00	11 00	12 00	13 00	13 00	14 00	15 00	16 00	17 00	18 00	19 00

Fig. 5630

CORNER CHISEL

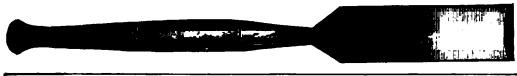
Size - - - - - - - - - - - inches	½	¾	⅞	1	1⅛	1¼	1½
Per dozen - - - - - - - - - - -	$30 00	32 00	34 00	36 00	38 00	40 00	44 00

Fig. 5628

CARPENTERS' GOUGE SOCKET FIRMER

Size - - - - - inches	½	⅝	¾	⅞	1	1¼	1⅛	1¾	2
Millwrights - per dozen	$16 00	17 00	18 00	19 00	20 00	22 00	24 00	26 00	28 00
Common - - per dozen	8 00	8 50	9 00	9 50	10 00	11 00	12 00	13 00	14 00

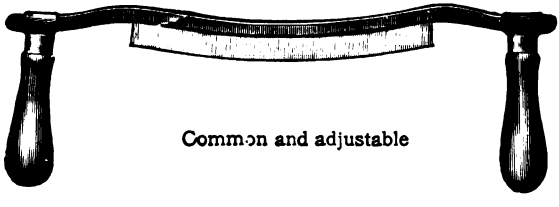
Fig. 5632



CARPENTERS' SLICK

Size - - - - - - - - - - - - - inches	2½	3	3½	4
Per dozen - - - - - - - - - - - - - -	$45 00	50 00	55 00	60 00

Fig. 5614



Common and adjustable

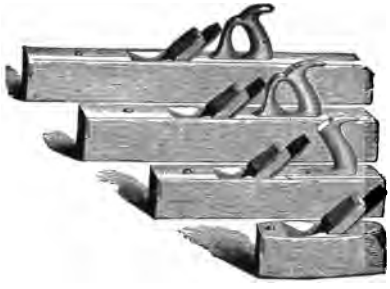
DRAWING KNIFE

Length, in.	9	10	12
Per dozen	$24 00	25 00	27 00

Adjustable, 10 in., per doz., $15 00

HARDWARE

Fig. 5636



JOINTER

FORE

JACK

SMOOTH

BENCH PLANES

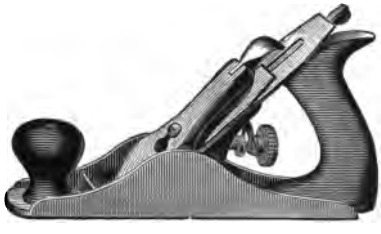
Smooth, No. 7	$0 90
Jack, No. 8	1 00
Fore No. 9	1 70
Jointer, No. 10	1 80

IRON PLANES

BLOCK
Fig. 5638

JACK
Fig. 5642

SMOOTH
Fig. 5640

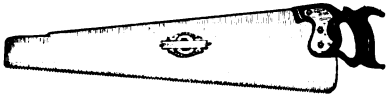


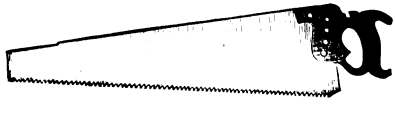
	Length, inches	Width of cutter, inches	Price
Block, fig. 5638	7½	1¾	$0 60
Block, adjustable	7½	1¾	85
Smooth, fig. 5640	5½	1¼	2 25
Smooth, fig. 5640	7	1⅝	2 75
Smooth, fig. 5640	8	1¾	3 00
Smooth, fig. 5640	9	2	3 25
Smooth, fig. 5640	10	2⅜	3 75
Jack, fig. 5642	14	2	3 75
Jack, fig. 5642	15	2¼	4 25
Fore, not illustrated	18	2⅜	4 75
Jointer, not illustrated	22	2⅜	5 50
Jointer, not illustrated	24	2⅜	6 50

Fig. 5648

HAND SAWS

Fig. 5646





O. W. S. Co., special, 26 inch, hand, fig. 5648	per dozen,	$12 00
Disston's, No. 7, 26 inch, hand, fig. 5646	per dozen,	20 00
Disston's, No. 8, 26 inch, hand, fig. 5646	per dozen,	21 50
Disston's, No. D8. 26 inch, hand, fig. 5646	per dozen,	22 50
Disston's, No. 7, 28 inch, hand, rip	per dozen,	23 50
Disston's, No. 12, 26 inch, hand, rip	per dozen,	29 00
Moore Bros.' special No. 8 hand, fig. 5648	per dozen,	20 00

HARDWARE

CROSS CUT SAW AND HANDLES

Fig. 5652

Fig. 5654

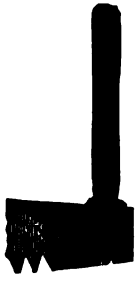
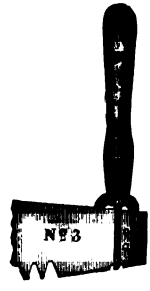


Fig. 5655



Crosscut Saws - - - -	per foot,	$0 60
Handles, fig. 5654 - - -	per pair,	28
Handles, fig. 5655 - - -	per pair,	36
Handles, Climax No. 103	per pair,	35

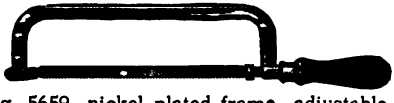
COMPASS SAW

Fig. 5650

10 inch - - - - - - -	per dozen,	$4 25
12 inch - - - - - - -	per dozen,	4 50
14 inch - - - - - - -	per dozen,	4 75
16 inch - - - - - - -	per dozen,	5 00
18 inch - - - - - - -	per dozen,	5 25

HACK SAW AND FRAME

Fig. 5659



HACK SAW BLADE

Fig. 5660

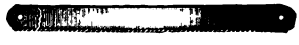
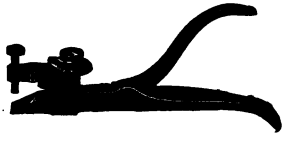


Fig. 5659, nickel plated frame, adjustable to 4 angles. Frame 8 inches, one blade with each frame - per dozen, $11 00

Length - - - - - - - - - inches	8	9	10	12	14	--
Flexible hack saw blades - per dozen	$0 65	70	85	1 05	1 67	--

Fig. 5644



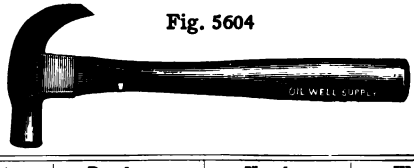
SAW SET AND VISE

Fig. 5657

Sets for hand saws, fig. 5644 - - -	per dozen,	$8 00
Sets for crosscut saws - - - - -	per dozen,	15 00
Stearn's No. 0 vise, fig. 5657 - - -	per dozen,	10 00

ADZE EYE NAIL HAMMER

Fig. 5604



Number	Weight	Per dozen	Number	Weight	Per dozen
1	1 lb. 4 oz.	$9 00	2	13 oz.	$8 00
1½	1 lb.	8 50	3	7 oz.	7 50

HARDWARE

Fig. 5608

RIVETING HAMMER
PLAIN EYE

No.	Weight	Per dozen
6	1 lb. 6 oz.	$7 50
5	1 lb. 2 oz.	7 00
4	15 oz.	6 50

Fig. 5610

RIVET SET

Size No. - -	00 and 0	1 and 2	3 and 4	5 and 6	7 and 8
Per dozen -	$9 00	7 50	6 00	4 50	3 75

Fig. 5537

PICK

5 to 6 pound - - - per dozen, $12 50
6 to 7 pound - - - per dozen, 13 50

Fig. 5538

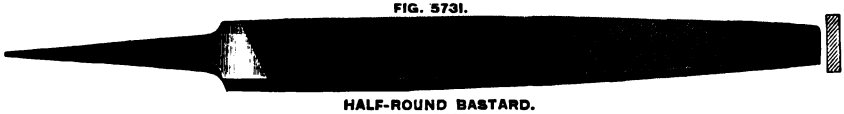
MATTOCK

5 pound - - - - - - - - - per dozen, $16 00
5½ pound - - - - - - - - per dozen, 16 50
6 pound - - - - - - - - - per dozen, 17 00

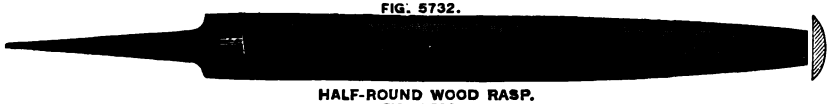
FILES

MILL BASTARD.
FIG. 5730.

FLAT BASTARD.
FIG. 5731.



HALF-ROUND BASTARD.
FIG. 5732.

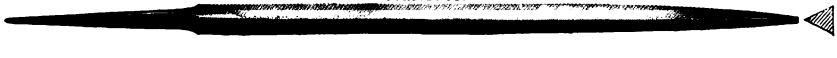


HALF-ROUND WOOD RASP.
FIG. 5733.

SQUARE BASTARD
FIG. 5734.

ROUND BASTARD.
FIG. 5735.

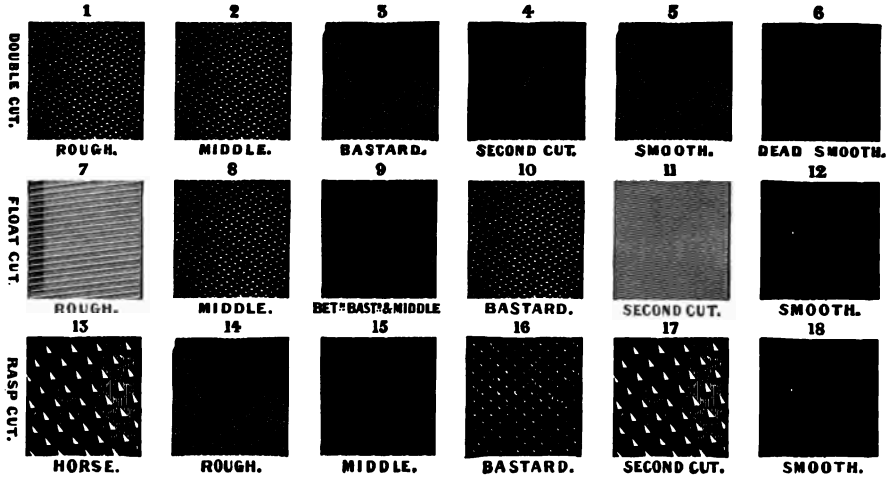
TAPER SAW.
FIG. 5736.



For list, see next page

HARDWARE

FILES—Fig. 5745



For illustrations, see page 317

Price per dozen

Length - - - - - - - - - - - inches	6	8	10	12	14	16	18	20
Mill and round bastard, figs. 5730-5735 - -	$3 50	4 30	5 60	7 50	10 70	14 70	20 20	27 40
Mill and round 2d cut - - - - - - - - -	4 00	4 90	6 40	8 60	12 20	16 80	22 70	30 70
Mill and round smooth - - - - - - - -	4 50	5 40	7 00	9 40	13 10	17 90	24 30	32 90
Flat bastard, fig. 5731 - - - - - - - -	4 30	5 30	7 00	9 70	13 30	17 80	23 90	31 50
Flat 2d cut - - - - - - - - - - - - -	4 80	6 10	8 10	11 00	15 30	20 10	26 80	35 30
Flat smooth - - - - - - - - - - - - -	5 30	6 60	8 70	12 10	16 70	22 30	29 20	38 30
Square bastard, fig. 5734 - - - - - - -	4 60	5 50	7 40	10 20	13 90	18 70	25 10	32 80
Square 2d cut - - - - - - - - - - -	5 10	6 30	8 50	11 50	16 10	21 20	28 20	36 70
Square smooth - - - - - - - - - - -	5 50	7 00	9 10	12 80	17 50	23 30	30 40	39 30
Hand and pillar Bastard - - - - - - - -	4 30	5 40	7 50	10 70	15 00	20 10	26 80	35 10
Hand and pillar 2d cut - - - - - - - -	5 10	6 30	8 70	12 30	17 00	22 80	29 90	39 20
Hand and pillar smooth - - - - - - - -	5 60	6 70	9 40	13 50	18 20	24 20	31 50	41 60
Half round and 3-square bastard, fig. 5732 -	6 10	7 50	9 10	11 80	15 50	20 60	27 50	36 20
Half round and 3-square 2d cut - - - - -	6 70	8 30	10 10	13 00	17 00	22 50	29 90	39 40
Half round and 3-square smooth - - - - -	7 10	8 90	10 70	13 90	18 30	24 20	32 00	42 30
Wood rasps, flat - - - - - - - - - -	7 40	9 40	12 80	17 50	23 20	30 80	40 90	-----
Wood rasps, ½ round, fig. 5733 - - - - -	8 10	10 10	13 70	18 70	24 80	32 90	43 60	-----

SAW FILES—Fig 5736

Price per dozen

Length - - - inches	3	3½	4	4½	5	5½	6	7	8	9	10
Common taper, single cut	$2 10	2 10	2 20	2 40	2 60	3 00	3 40	4 30	5 40	6 60	8 10
Slim taper, single cut - -	2 10	2 10	2 20	2 30	2 50	2 90	3 10	3 80	4 50	5 40	6 40

CLARK'S EXPANSIVE BIT—Fig. 5586

Large size - per dozen, $26 00
Extra cutters, small - - - - - - - - - - - - - - - - - - - per dozen, 3 75
Extra cutters, large - - - - - - - - - - - - - - - - - - - per dozen, 6 00

HARDWARE

AUGER—Fig. 5577

Size - - - - - - - - - - - inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
Per dozen - - - - - - - - - - - -	$8 25	9 50	10 75	12 00	13 25	15 00	17 00
Size - - - - - - - - - - - inches	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Per dozen - - - - - - - - - - - -	$22 00	26 00	30 00	40 00	50 00	70 00	90 00

IRWIN'S SOLID CENTER AUGER

Size - - inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Per dozen - - - -	$8 25	9 50	10 75	12 00	13 25	15 00	17 00	22 00	26 00	30 00

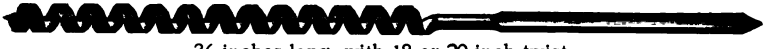
AUGER BIT—Fig. 5576

Size in 16ths -	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Com'n per doz.	$4 50	4 00	4 00	4 00	4 50	5 00	5 50	6 00	7 00	7 00	8 00	8 00	9 00	9 00

IRWIN'S SOLID CENTER AUGER BIT—Fig. 5575

Size in 16ths - - -	4	5	6	7	8	9	10	11	12	13	14	15	16
Per dozen - - - -	$4 00	4 00	4 00	4 50	5 00	5 50	6 00	7 00	7 00	8 00	8 00	9 00	9 00

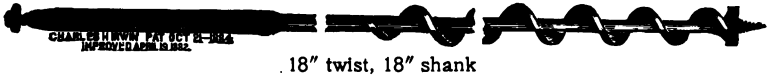
SHIP AUGER WITH SCREW—Fig. 5581



36 inches long, with 18 or 20 inch twist

Size - - - - - - - - inches	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
18 inch twist - - - per dozen	$25 50	28 50	32 10	35 70	39 30	42 90	47 70	52 50
20-inch twist - - - per dozen	$28 80	32 10	36 00	39 90	43 80	47 70	52 80	57 90

IRWIN'S DERRICK OR SHIP AUGER—Fig. 5583



18" twist, 18" shank

Size in 16ths - - -	8	10	12	13	14	15	16	17	18	20
Per dozen - - - -	$21 00	27 90	31 80	34 50	36 30	39 00	40 80	43 50	45 30	49 80

Made with either single or double cutter

CAR AUGER—Fig. 5579

Size in 16ths - - - - - - - -	4	5	6	7	8	9	10	11
Per dozen - - - - - - - - -	$9 00	9 00	9 00	10 00	11 25	12 50	13 75	15 00
Size in 16ths - - - - - - - -	12	13	14	15	16	17	18	20
Per dozen - - - - - - - - -	$16 25	17 50	19 00	20 50	22 00	24 00	26 00	30 00

HARDWARE

BRACES FOR BITS

Fig. 5570

Fig. 5572

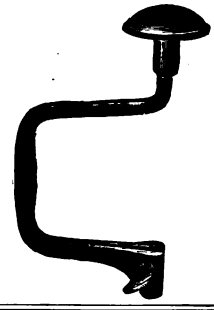
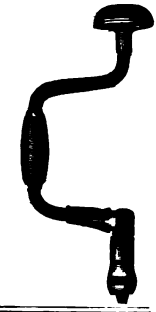


Fig. 5574



Size - inches	10	12
Fig. 5570, Fray's Sleeve, No. 210-212 - - - - - - - - per dozen	$27 00	30 00
" " " 310-312 - - - - - - - - " "	18 00	20 00
Fig. 5574, Fray's Ratchet, No. 101-121 - - - - - - - - " "	36 00	39 00
" " " 102-122 - - - - - - - - " "	27 00	30 00
Fig. 5572, Spofford's, " 10-12 - - - - - - - - " "	23 00	27 00

Fig. 5663

SWAN'S PATENT IRON FRAME BORING MACHINE

UPRIGHT

Fig. 5663

Painted standard, without augers - $8 50

BABBITT METAL

Genuine - - - - - - per pound, $0 60
No. 4 - - - - - - - per pound, 12

MELTING LADLE

Fig. 5533

Melting ladles - - - - - - - number	1	2	3	4	6	7
Diameter of bowl - - - - - inches	2½	3	3½	4	5	6
Per dozen - - - - - - - - - -	$3 75	4 65	5 50	6 50	8 75	10 00

Long handle, with 6 inch bowl, each - $1 25

HARDWARE

PLUMB AND LEVEL

Fig. 5612

No. 490½, Adjustable - per dozen, $12 25
No. 290, Non-adjustable - - - - - - - - - - - - - - - - - - " " 8 25

CHALK

Color - - - -	White	Red	Blue
Per gross - -	$1 30	1 80	2 00

CHALK LINE REELS

Per dozen - - - - - - - - - - $0 95

CARPENTERS' PENCILS

No. 35, 9 inch - - - - per dozen, $0 50

CHALK LINES

No. 6, 20 ft. long - - - per dozen, $0 50
No. 6, 40 ft. long - - - per dozen, 1 00

SCRATCH AWLS

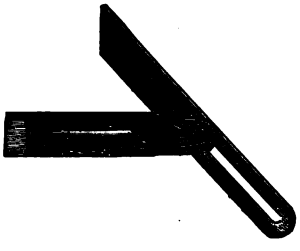
No. 2- - - - - - - - per dozen, $0 75

MARKING GAUGE

Fig. 5671

Per dozen - - - - - - - - - - $1 00

Fig. 5669



SLIDING T BEVEL—Fig. 5669

Size - - - - inches	6	8	10	12	14
Per dozen - - - - -	$5 50	6 00	6 50	7 00	7 50

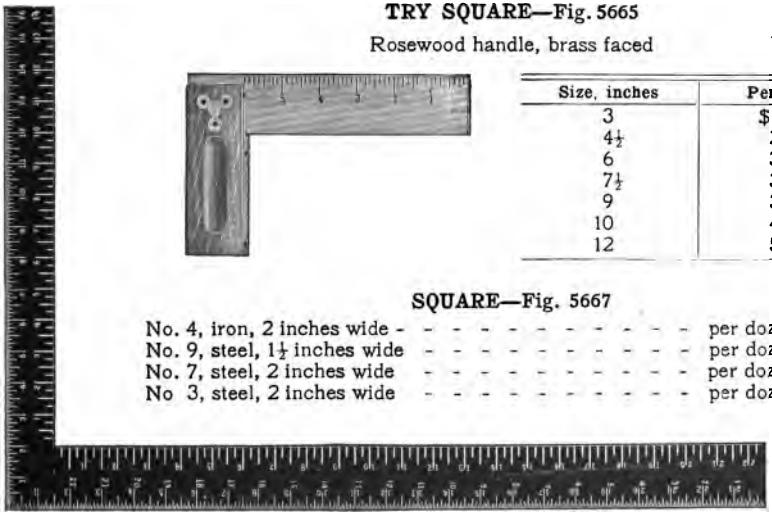
TRY SQUARE—Fig. 5665

Rosewood handle, brass faced

Size, inches	Per dozen
3	$1 80
4½	2 25
6	3 00
7½	3 45
9	3 90
10	4 35
12	5 10

SQUARE—Fig. 5667

No. 4, iron, 2 inches wide - - - - - - - - - - - - per dozen, $12 50
No. 9, steel, 1½ inches wide - - - - - - - - - - - per dozen, 22 00
No. 7, steel, 2 inches wide - - - - - - - - - - - per dozen, 23 50
No 3, steel, 2 inches wide - - - - - - - - - - - per dozen, 27 50



HARDWARE

HANDLES

Fig. 5694
Single bit axe - - per doz., $3 20

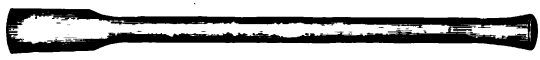


Fig. 5696
Double bit axe - - per doz., 3 20

Fig. 5698
Pick - - - - per doz., 3 50
Mattock - - - per doz., 3 50

Fig. 5700
Sledge - - - per doz., 2 10

Fig. 5702
Adze - - - - - per doz., 3 50

Fig. 5704
Adze eye hammer - - - - - - per doz., 60

Fig. 5710
Hatchet - - - - - - - - - - per doz., 60
For Oil King hatchet - - - - per doz., 1 00

AUGER

Fig. 5714

Common - - - - - - - per doz., $0 50

Fig. 5716

Patent - - - - - - - - per doz., $12 00

Fig. 5720

Swan's No. 24 - - - - - per doz., $12 00

Fig. 5721

Pratt's No. 1 or No. 2 - - per doz., $12 00

Fig. 5712.
File - per doz., 75

HAMMER HANDLES—BALL PEEN

Not illustrated

15 inches long - - - - per dozen, $0 60
16 inches long - - - - per dozen, 70
18 inches long - - - - per dozen, 80
20 inches long - - - - per dozen, 90

MISCELLANEOUS

Broad axe, not illustrated - per dozen, 3 25
Socket firmer chisel, not illustrated - - - - - - - - - - - - - - - - - - per dozen, 50
Socket firmer chisel, framing, not illustrated - - - - - - - - - - - - - - - per dozen, 75
Hand saw, not illustrated - per dozen, 1 40
Jack plane handles, not illustrated - - - - - - - - - - - - - - - - - - - per dozen, 50
Shovel D handles, not illustrated - per dozen, 3 35
Shovel long handles, not illustrated - - - - - - - - - - - - - - - - - - - per dozen, 2 50

SCREW DRIVERS

Length - - inches	3	4	5	6	7	8	10	12
Per dozen - - - -	$2 00	2 50	3 00	3 50	4 00	4 75	6 00	8 00

HARDWARE

RULES

Fig. 5673

6-inch caliper

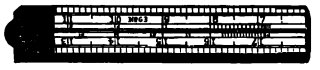
Fig. 5674

12-inch

Fig. 5676

12-inch caliper

Fig. 5675



24-inch

No. 36, caliper, square joint, 2 fold, 6 inch, $\frac{7}{8}$ inch wide, fig. 5673 - - - per dozen, $4 50
No. 32½, caliper, arch joint, 4 fold, 12 inch, 1 inch wide, fig. 5676 - - - per dozen, 10 00
No. 65, square joint, 4 fold, 12 inch, $\frac{5}{8}$ inch wide, fig. 5674 - - - - - - per dozen, 2 00
No. 57, arch joint, bound, 4 fold, 12 inch, $\frac{5}{8}$ inch wide, fig. 5674 - - - - per dozen, 6 25
No. 61, square joint, 4 fold, 24 inch, 1 inch wide, fig. 5675 - - - - - - per dozen, 3 00
No. 62, square joint, bound, 4 fold, 24 inch, 1 inch wide, fig. 5675 - - - per dozen, 8 00

Fig. 5678

ASSES' SKIN TAPE MEASURE

Length - - - - - - - - feet	25	30	40	50	75	100
Per dozen - - - - - - - - -	$3 75	4 00	4 50	5 00	7 50	9 00

STEEL TAPE MEASURE

Fig. 5679

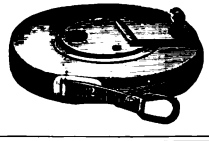
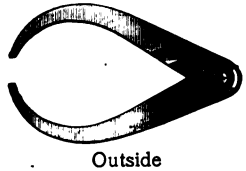


Fig. 5681

Length - - - - - - - - - - - - feet	25	33	40	50	66	75	100
Steven's excelsior - - - - - - - each	----	----	----	$7 15	----	----	12 90
Home, fig. 5679 - - - - - - - - each	$3 20	----	.	3 90	----	5 10	6 60
Harvard excelsior, fig. 5681 - - - each	2 00	2 25	----	2 75	3 10	3 35	4 10
Lufkin, "metallic" leather case, fig. 5681 - - - - - - - - - - each	1 70	2 00	----	2 50	2 80	3 10	3 90
Challenge, not illustrated - - - - each	3 25	----	----	4 00	----	5 25	6 75
Chesterman's steel - - - - - - each	4 50	5 20	6 00	7 20	9 20	10 40	12 80
Chesterman's wired - - - - - - each	1 80	2 10	2 30	2 60	3 00	3 30	4 20

CALIPERS

Fig. 5683



Outside

Fig. 5684

Inside

Size - - - inches	3	4	5	6	8	10	12	14	16	18	20	24
Outside or inside - each	$0 40	50	55	65	80	90	1 00	1 50	1 75	2 10	2 50	3 00

HARDWARE

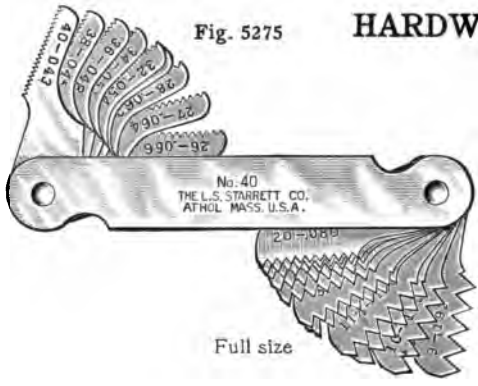


Fig. 5275

THREAD GAUGE

No. 11½, 16 leaves - - - - - $1 00
No. 24, 4 leaves - - - - - 50

SPLITTING CHISEL

Fig. 5531

Per pound - - - - - - - - - $0 42

COLD CHISEL

Fig. 5529

Per pound - - - - - - - - $0 38

PUNCH

Fig. 5527

Per pound - - - - - - - - - - - $0 38

CROWBARS

Per pound - $0 12

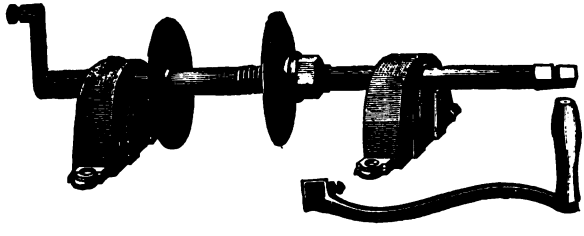
HOOP DRIVER

Fig. 5540

Per pound - - - - $0 35

GRINDSTONE FIXTURES

Fig. 5616



Length of shaft - - - inches	24	19	17	15
Complete set - - - - - -	$2 00	1 75	1 50	1 25

OIL STONES

	Stone	Slips
Washita, No. 1 - per pound	$0 40	70

GRINDSTONES

Not illustrated

Per pound - - - - - - - - - - $0 02

BENCH SCREWS

Size screw - - - - - inches	1	1⅛	1¼	1½	2	2½	2¾
Length screw - - - inches	15	16	17	19	----	----	----
Wrought iron - - per dozen	$10 00	11 00	15 00	21 70	----	----	----
Wood - - - - - per dozen	------	-----	-----	-----	3 30	3 75	6 00

HARDWARE

BURNER AND GAS PLIERS

Fig 5685

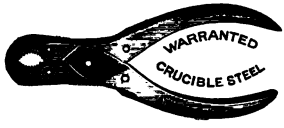
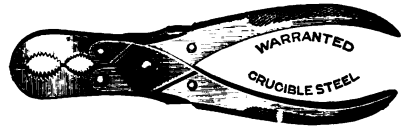
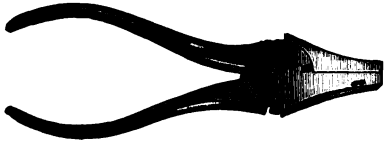


Fig. 5687



Size - - - - - - - - - - - - - - - inches	5 (one hole), fig. 5685	7 (two hole), fig. 5687
Per dozen - - - - - - - - - - - - - - - -	$9 50	12 00

COMBINATION PLIERS AND CUTTING NIPPERS—Fig. 5689



Size, inches	Cuts wire up to	Per dozen
4	14 gauge	$10 00
6	11 gauge	12 00
8	8 gauge	15 00
10	6 gauge	20 00
12	5 gauge	30 00

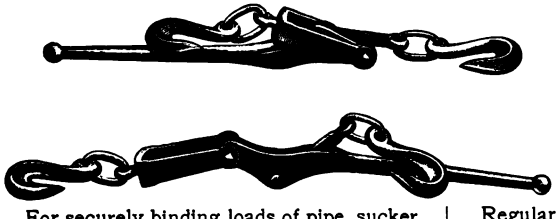
PEASE COMBINATION PLIERS

Fig. 5688

Size, inches	Capacity, size pipe, inches	Black, per dozen	Nickel plated, per dozen
6	3/4	$13 50	15 00
8	1	16 00	18 00
10	1	18 00	21 00
14	1	24 00	30 00

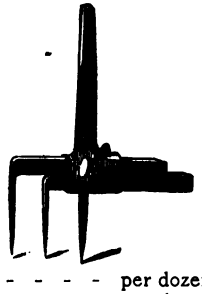
GOODYEAR LOAD BINDER

Fig. 5824



For securely binding loads of pipe, sucker rods, etc.
Per pair - - - - - - - - - - $5 00

WASHER CUTTER—Fig. 5235

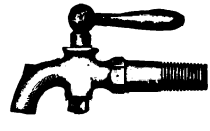


Regular - - - - - - per dozen, $11 00
Large - - - - - - per dozen, 14 00

PETROLEUM OIL FAUCET

Fig. 5870

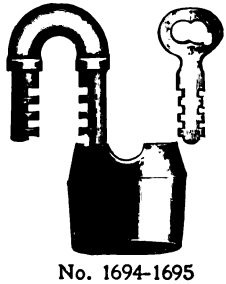
Numbers - - - - - - - - -	13	14	5	6	7
Size - - - - - - - inches	3/8	1/2	5/8	3/4	1
Per dozen - - - - - - - - -	$10 00	11 00	13 00	16 00	23 00



HARDWARE

PADLOCKS

Fig. 5777



No. 1694-1695

Fig. 5777-B

Fig. 5777-C

Fig. 5777, No. 1694—Scandinavian or jail, two keys - - - - - - - - - per dozen, $4 00
Fig. 5777, No. 1695—Scandinavian or jail, two keys - - - - - - - - - per dozen, 4 50
Fig. 5777-B, No. 10—Champion 6 lever, 2¼ inch, brass, two keys, 10-inch chain - per dozen, 14 00
Fig. 5777-C, No. 1—Champion, same, no chain - - - - - - - - - - per dozen, 12 00
Fig. 5777-C, No. 9—Champion, same, elongated shackle - - - - - - - per dozen, 15 00
Fig. 5777-C, No. 7—Champion, same, elongated shackle, no chain - - per dozen, 13 00

NOTE.—The Champion 6-lever padlock keys all differ, unless made alike to order.
If made with keys alike, to pass, add $1.00 per dozen.
If made with both master and special keys, add $6.00 per dozen.

YALE PADLOCKS

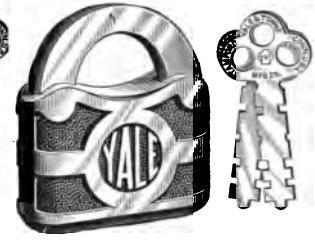
Fig. 5778

No. 805

Fig. 5578-D

No. 8454

Fig. 5778-C

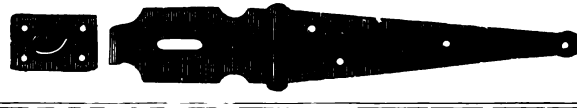


No. 853

Fig. 5778, No. 805—Cast iron case and bronze shackle - - - - - - - per dozen, $15 40
Fig. 5778-D, No. 8454—Steel shell and shackle - - - - - - - - - per dozen, 21 00
Fig. 5778-C, No. 853—Bronze case and bronze shackle - - - - - - - per dozen, 31 00

HINGE HASP AND STAPLE

Fig. 5779

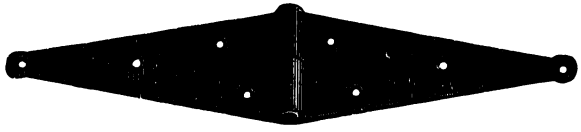


Size - - - - - - inches	3	4½	6	8	10	12
Per dozen - - - - - - -	$ 50	60	80	1 05	1 50	2 10

HARDWARE

STRAP AND TEE HINGES, HEAVY

Fig. 5781



Tee hinges not illustrated

Size - - - - - - - - - inches	4	5	6	8	10	12	14	16
Strap hinges - - per dozen pair	$1 60	2 15	----	----	----	----	----	----
Strap hinges - - - - per pound	----	----	15	13½	13	13	13	13
Tee hinges - - per dozen pair	90	1 05	1 25	1 55	2 30	3 20	4 45	5 40
Hasps with staples - per dozen	----	90	1 00	1 30	2 00	- -	----	----
Hasps with hook - - per dozen	----	1 20	1 40	1 80	2 50	----	----	----

HOOKS AND STAPLES

Not illustrated

Size, inches	3½	4	4½	5	6
Per gross -	$9 00	10 00	11 00	12 00	14 00

STAPLES

Not illustrated

Size - inches	2	2¼	2½	3
Per gross - -	$1 70	2 00	2 35	3 20

Fig. 5804

CHAIN, STEEL OR IRON

B. B. B. X.

Size - - - inches	3/16 & ¼	5/16	⅜ & over
Per pound - - - -	$0 15	12	10

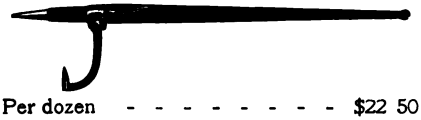
Fig. 5802

WHEELBARROW

No.		Per dozen
3	With wood wheel - - - - - - -	$22 00
4	With steel wheel - - - - - - -	24 00

CLIP PEAVIE

Fig. 5807



Per dozen - - - - - - - - - $22 50

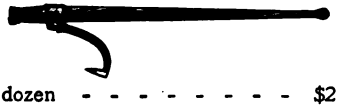
SOCKET PEAVIE

Fig. 5808

Per dozen - - - - - - - - - $23 50

CLIP CANT HOOK

Fig. 5810



Per dozen - - - - - - - - - $21 00

SOCKET CANT HOOK

Fig. 5811

Per dozen - - - - - - - - - $22 00

Fig. 5823

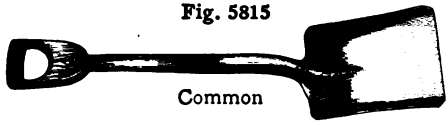
SCOOP

No. 4, steel, half polished - per dozen, $15 50
No. 5, steel, half polished - per dozen, 16 00
No. 6, steel, half polished - per dozen, 16 50

HARDWARE

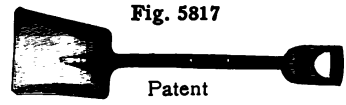
SHOVELS

D HANDLE
Fig. 5815



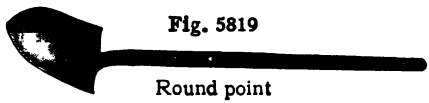
Common

D HANDLE
Fig. 5817



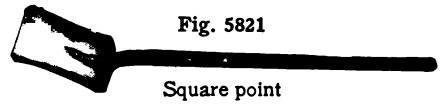
Patent

LONG HANDLE
Fig. 5819



Round point

LONG HANDLE
Fig. 5821



Square point

CANAL SHOVELS—BLACK—HOLLOW BACK

D or long handle, round or square point, same price.

Size No.		2	3	4	5	6	7
Width	inches	9⅞	10⅜	10⅞	11¼	11⅝	12
Length	inches	12	12½	13	13½	14	14½
Per dozen		$18 00	19 00	20 00	21 00	22 00	23 00

COAL SHOVELS—BLACK—HOLLOW BACK

D or long handle same price.

Size No.		1	2	3
Width	inches	13¾	14¼	14¼
Length	inches	14½	14¾	15
Per dozen		$20 00	21 00	22 00

DITCHING SPADES

Size	inches	14	16	18	20
Per dozen		$24 00	24 50	25 00	26 00

POST HOLE AUGER—Fig. 5825

Sizes 4, 5, 6, 7, 8, and 9 inches - - - - - - - - - - - - - - - - per dozen, $18 00

Fig. 5825

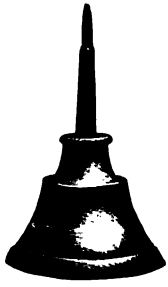
IWANS POST HOLE AUGERS—Not illustrated

Size	inches	4 to 6	7	8	9	10
Per dozen		$28 00	30 00	30 00	32 00	36 00

MALLEABLE IRON OILER

Size No.		1	2	3
Old style	per dozen	$3 60	4 00	4 40
Size No.		11	12	13
New style	per dozen	$3 60	4 00	4 40
Tubes	per dozen	1 80	1 80	1 80

Fig. 5842



GEM OILER—Not illustrated

No. 1304, ½ pint—4-inch Spout, per dozen - - - - $6 00
No. 1504, 1 pint—4-inch Spout, per dozen - - - - 8 00

HARDWARE

Fig. 5848

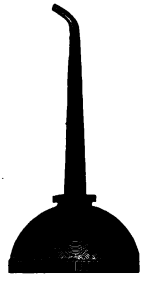
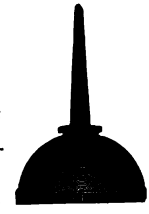


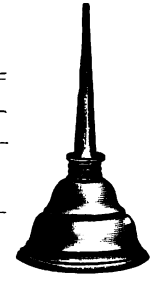
Fig. 5850



STEEL COPPERIZED OILERS

Size - - - - - - - - - - - - No.	13	14
Length of nozzle - - - - - - - inches	3	9
Per dozen - - - - - - - - - - - -	$5 50	6 50

Fig. 5840



BRASS AND ZINC OILERS

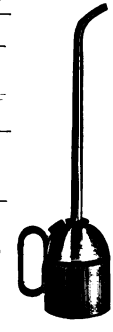
	BRASS		ZINC			
Size - - - - - - - - - - No.	2	3	2	3	4	5
Capacity - - - - - - - - - gills	1¾	2	1¾	2	--	--
Per dozen - - - - - - - - - -	$3 50	4 00	2 00	2 25	2 75	3 50
Tubes - - - - - - - - - - each	10	10	10	10	----	----

LONG SPOUT BRAZED STEEL OILER—Fig. 5846

Fig. 5846

Capacity - - - - - - -	1 pint	1½ pints	1 quart	2 quarts
Per dozen - - - - - - -	$12 00	12 00	13 00	15 00

Fig. 5847



STEEL COPPERIZED RAILROAD OILER—Fig. 5847

No. - - - - - - - - - - - - - - -	10	11
Capacity - - - - - - - - - - - - - -	1 pint	1 quart
Length nozzle - - - - - - - - - - inches	12	18
Per dozen - - - - - - - - - - - - - -	$14 00	18 00

BRAZED STEEL PYRAMID TORCH

Fig. 5831

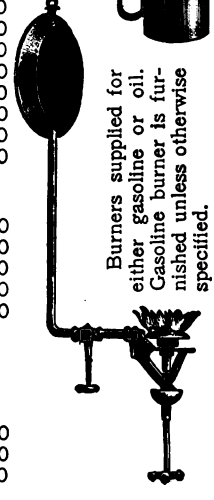
Fig. 5831

No. 80, ½ pint, 1 burner - - - - per dozen, $7 00
No. 81, 1 pint, 1 burner - - - - per dozen, 9 00
No. 82, 1 quart, 1 burner - - - per dozen, 10 00
No. 83, 1 quart, 2 burners - - - per dozen, 11 00
No. 84, 2 quarts, 1 burner - - - per dozen, 12 00
No. 85, 2 quarts, 2 burners - - per dozen, 13 00
No. 86, 4 quarts, 2 burners - - per dozen, 15 00
No. 87, 4 quarts, 3 or 4 burners, per dozen, 18 00

BRAZED STEEL BROAD TOP TORCHES

No. 90, 1 pint, 1 burner - - - - per dozen, $9 00
No. 91, 1 quart, 1 burner - - - per dozen, 10 00
No. 92, 1 quart, 2 burners - - - per dozen, 11 00
No. 93, 2 quarts, 1 burner - - - per dozen, 12 00
No. 94 2 quarts, 2 burners - - per dozen, 13 00

Fig. 5833



Burners supplied for either gasoline or oil. Gasoline burner is furnished unless otherwise specified.

GASOLINE OR OIL TORCH—Fig. 5833

Price complete -	$1 50
Burner only -	1 00
Valve only -	50

HARDWARE

Fig. 5830

BRAZED STEEL TALLOW POT

No. 40, ½ gallon capacity - - - - - - per dozen, $15 00
No. 41, 1 gallon capacity - - - - - - per dozen, 18 00

DINNER
Fig. 5864

PAILS

Dinner, 5 quarts, fig. 5864 - - - - - - - - - - - - per dozen, $8 00
Dinner, 6 quarts, fig. 5864 - - - - - - - - - - - - per dozen, 9 50
Dinner, 6 quarts, square, fig. 5864 - - - - - - - - per dozen, 9 00
Wooden, 3 hoops, not illustrated - - - - - - - - - per dozen, 3 00
Wooden, 2 hoops, not illustrated - - - - - - - - - per dozen, 2 75
Wooden, "Buckeye" barn, not illustrated - - - - - - per dozen, 9 00

Fig. 5855

LANTERNS

Tubular No. 0, with square lift - - per dozen, $13 00
Globes - - - - - - - - - - - - - per dozen, 1 00
Burners - - - - - - - - - - - - - per dozen, 90
Wicks - - - - - - - - - - - - - per dozen, 05

REGULAR
Fig. 5860

OIL CANS

½ gallon, tin, fig. 5860 - - - - - - per dozen, $3 00
1 gallon, tin, fig. 5860 - - - - - - per dozen, 4 00
1 gallon, jacket, fig. 5862 - - - - - - - each, 40
2 gallons, jacket, fig. 5862 - - - - - - - each, 55
3 gallons, jacket, fig. 5862 - - - - - - - each, 70
5 gallons, jacket, fig. 5862 - - - - - - - each, 85
10 gallons, jacket, fig. 5862 - - - - - - - each, 1 50

WOOD JACKET
Fig. 5862

IRON ROOFING AND SIDING
Either plain or corrugated

ROOF RIDGE CAP
Fig. 5881

BEADED CEILING
Not illustrated

ROOF RIDGE ROLL
Fig. 5883

Prices quoted on specifications

A sketch should accompany each order for siding and roofing, showing height, length and width of building; also projection and pitch of roof.

ASPHALTUM

Per gallon - $0 75

Half or full barrels at market rate.

BORAX

Small quantities - per pound, $0 15

By the barrel, special.

BROOMS

Not illustrated

Common, all corn	per dozen,	$4 00
No. 4, factory, all corn	per dozen,	4 50
No. 7, factory, all corn	per dozen,	5 25
No. 4, rattan mixed	per dozen,	6 00
No. 8, rattan mixed	per dozen,	7 00

COAL

Blacksmith - per 100 pounds, $0 35

EMERY

In 10-pound tin cans, 15 cents per pound

Quantity	Ream	Quire	Sheet
Cloth, FF to No. ½	$24 00	1 25	06
Paper, Nos. 00 to ½	9 00	50	02½
Paper, No. 1 to 2	12 00	60	03

FLAX SEED

Per pound - $0 10

IRON

Merchant, flat, round and square, regular sizes - - - - - - - - - - - - per pound, -----

Norway riveting, ½-inch diameter - per pound, $0 10

Cut to order, 3 cents per pound extra.

LEAD

Red, in 1-pound cans, in oil	$0 15
White, in 1-pound cans, in oil	14
Sheet by the pound	10

LAMP WICK

By the bale	per pound,	$0 25
Less than bale	per pound,	30
Ball	per ball,	05

MARLINE

Per pound - - - - - - - - - - $0 20

OAKUM

By the pound - - - - - - - - $0 12

OIL

Lard, winter strained - per gallon, $1 00

Winter strained lard, barrel rates subject to market quotations.

Cylinder and engine oils, barrel rates subject to market quotations.

PAPER

Hardware, common	per pound,	$0 08
Building	per pound,	04
Best Manila	per pound,	10
Tarred	per pound,	04

PITCH

Per pound - - - - - - - - - - $0 03

PLUMBAGO

Per pound - - - - - - - - - - $0 30

SAND PAPER

	Per ream	Per quire
Flint, Nos. 00 to ½	$6 50	30
Flint, No. 1	7 00	30
Flint, No. 1½	7 50	35
Flint, No. 2	8 00	35

Per sheet, 3 cents.

STEEL

Not illustrated

Small sizes, octagon, square and round, by the bar	per pound,	$0 12
Small sizes, octagon, square and round, less than bar	per pound,	15
Large sizes for oil well tools	per pound,	15

TALLOW

In 10-pound packages	per pound,	$0 10

TWINE

Seed bag	per pound,	$0 25
Wrapping	per pound,	35

WASTE

White, No. 1	per pound,	$0 12

WIRE

Number	0 to 9	10	12
Iron, black per pound	$0 10	11	11½
Iron, galvanized per pound	12	13	14

Copper, No. 0 to 20	per pound,	$0 50
Torpedo, No. 16	per pound,	15
Torpedo, No. 20	per pound,	20

GALVANIZED WIRE STRAND

For smoke stack guys, electric light plants, street railways, signal cord, fencing and other purposes.

7 wires No.	8	10	11	12	15	17	18	20	21
Approximate diameter inch	½	7/16	3/8	5/16	¼	3/16	5/32	⅛	3/32
Approximate weight per 100 ft. lbs.	**52**	**40**	**30**	**22**	**13**	**8**	**5**	**3½**	**2¼**
Approximate strength in pounds	8,320	6,000	4,700	3,300	1,750	1,000	700	375	320
Price per 100 feet	$4 50	3 75	2 75	2 25	1 75	1 25	1 15	1 00	80

For special galvanized wire strand for connecting pumping wells, see page 258.

PACKING

ASBESTOS—MILL BOARD OR FLAT

In sheets 40 x 40 and 42 x 44 inches, from 1/32 to ½ inch thick.

Approximate weight per sheet 40 x 40 inches:

Thickness inch	1/32	1/16	3/32	⅛	3/16	¼	⅜	½
Weight lbs.	**1¾**	**3½**	**5½**	**8**	**10½**	**14**	**21**	**28**

Per pound	$0 20

ASBESTOS PISTON ROD

On reels containing 10, 15, 25 and 50 pounds each. Regular sizes from ¼ to 2 inches in diameter	per pound,	$0 50

ASBESTOS WICK

In ¼, ½ and 1 pound balls and 5 and 10 pound spools	per pound,	$0 50

ITALIAN FLAX

Coils of 25 or 50 pounds, or 100-pound reels	per pound,	$0 30
Less than a coil	per pound,	40

PACKING

RUBBER

MANUFACTURERS' LIST

Cloth insertion. Cloth on one or both sides

Thickness, inches	1-ply, per pound	2-ply, per pound	3-ply, per pound	4-ply, per pound
1/64	$0 70	--	--	-
1/32	65	--	--	--
1/16	60	63	66	--
3/32	55	58	61	--
1/8	55	55	58	61
3/16	55	55	55	58
1/4	55	55	55	55

One ply of cloth to every 1/16 inch thickness.

Three cents per pound additional will be charged for each extra ply of cloth. Each cloth, whether insertion or on outside, to count as one ply.

All cloth insertion or plain packing is one yard wide and any length desired.

All sizes at retail	per pound,	$0 35
Rubber piston, round and square, 1/4 to 1 1/2 inches	per pound,	85
Steam pump piston, 1/4 to 1 1/2 inches	per pound,	1 00
Soapstone	per pound,	15
Usudurian, sheet	per pound,	80
Usudurian gaskets, rings, etc.	per pound,	95
Spiral packing, Garlock's	per pound,	1 20

Garlock's packing is made 12 feet long and in sizes from 3/16 inch to 2 inches. Each strip is coiled in a box made especially for it, so that there is no chance of its getting impregnated with dust or grit.

APPROXIMATE WEIGHT

The following is a close estimate of the weight of a box of Garlock's spiral packing. Each box contains 12 feet, and we furnish only full boxes. Larger sizes to order.

Size - inches	8/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
Weight - lbs.	1/2	3/4	1	1 1/2	1 3/4	2 1/8	2 7/8	3 5/8	4 1/4	4 3/4	5 3/4	6 5/8	7	8 1/4

Square flax packing - per pound, $0 85

This packing is made in sizes from 1/4 to 3 inches or over. Put up in 5 and 10 pound boxes.

GASKETS

JOHNSON'S METALLIC

For malleable iron unions

Size - - - - - - - - - - - - - - - inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Per 100 - - - - - - - - - - - - - - -	$0 50	50	60	70	80	1 00	1 20	1 50

MOULDED RUBBER

For malleable iron unions

Size - - - - - - - - - - - - - - - inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Per 100 - - - - - - - - - - - - - - -	$0 55	60	65	75	80	1 10	1 20	1 50	2 70

Plumbers who have bothered with cutting union washers of sheet packing will appreciate these goods.

MOULDED RUBBER

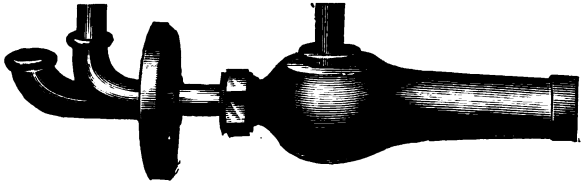
For flange unions

Size - - - - - - inches	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Each - - - - - - - - -	$0 10	12	15	20	25	30	35	38	40	45	50

OIL BURNERS

PARSON'S

Fig. 3210



Complete - $15 00

REID'S

Fig. 3214

	Weight, lbs.	Price
No. 2, for boiler -	15	$15 00
No. 3, for burning brick -	5	13 00

KIRKWOOD OIL ATOMIZER OR BURNER

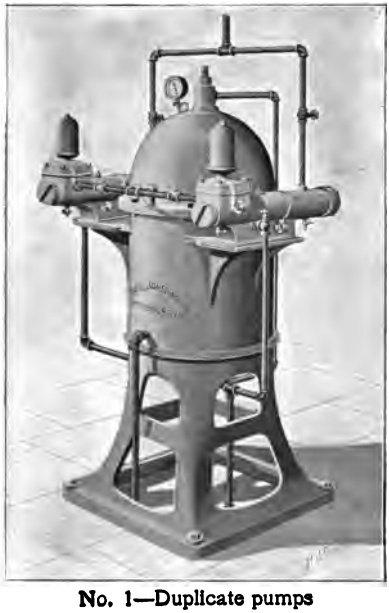
Fig. 3215-A

THE KIRKWOOD PATENT OIL ATOMIZER OR BURNER

1. It can be operated with either steam or compressed air.
2. It does not clog.
3. It is easily cleaned.
4. The supply of oil and steam is regulated at the point of combustion rather than far back in the burners, as those of other manufacturers.
5. There is a graduated scale for both the steam and oil supply. This is a feature possessed by no other burner and is a great assistance to the firemen in charge of the boilers.

Price - $20 00

Fig. 3215-B



No. 1—Duplicate pumps

KIRKWOOD DUPLICATE PUMPING AND HEATING SYSTEM

The Kirkwood pumping and heating system consists of a base or stand containing a chamber with a pipe coil, through which the oil is pumped, and is surrounded by exhaust steam from the pump. The upper part consists of a chamber, into which the oil goes from the pump on its way to the coil and automatic release valves, by which the excess of oil is returned to the storage tank without being heated.

The whole system is complete with gauge for indicating the pressure, all piping and connections. The system illustrated has duplicate pumps, separately connected, each one being capable of supplying the entire boiler plant in which it is installed, so that one pump only need be used at a time, giving, thereby, a duplicate system.

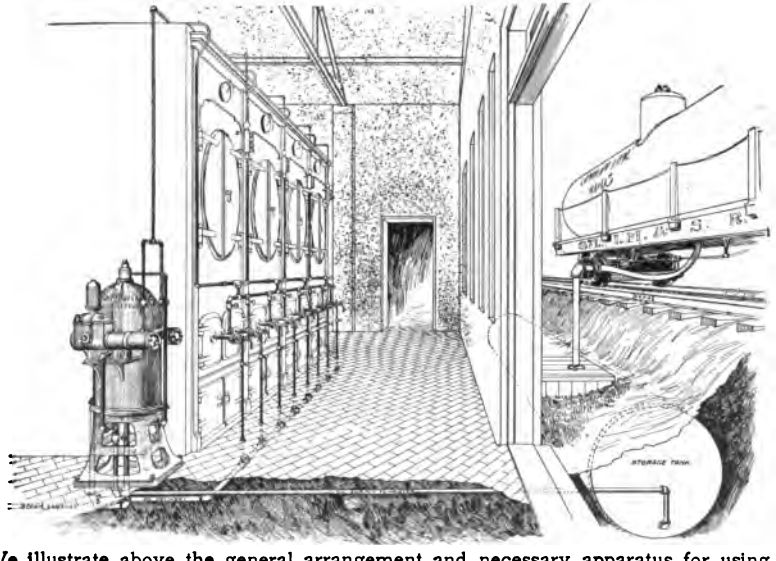
No. 1, with duplicate pumps - - - $400 00
No. 0, with duplicate pumps - - - 200 00
No. 0, with single pump - - - - - 150 00

Davidson or Moore pumps furnished with this outfit unless pumps of other makes are specially ordered.

BOILER PLANT EQUIPPED FOR BURNING OIL FUEL

COMPLETE INSTALLATIONS
GUARANTEED RESULTS

Fig. 3215-C



We illustrate above the general arrangement and necessary apparatus for using fuel oil under a battery of boilers. Local conditions, of course, vary this arrangement.

Prices for complete installations furnished upon application.

COMPARATIVE COST OF OIL AND COAL

	ITEMS	Bituminous coals mined west of Ohio and used in western and south western states	SMALL SIZES OF ANTHRACITE				Pittsburgh bituminous used in mills of Pennsylvania and on great lakes	Semi-bituminous; Atlantic ocean traffic; mills of eastern and middle states		
			Culm	No. 3 buckwheat or barley	No. 2 buckwheat or rice	No. 1 buckwheat and pea		Hand-fired	Mechanical stokers and pat. furnaces*	
									Ash 10%	Ash 5%
1.	Pounds evaporation per pound wet[3] coal, from and at 212°, at about 10 square feet of heating surface per boiler horse power	7.5	7.75[2]	8.25[2]	8.50[2]	8.75	9.50	10.00	10 50	11.00
2.	Pounds evaporation per pound of Beaumont oil from and at 212° at about 10 square feet of heating surface per boiler horse power	14.8	14.8	14.8	14 8	14.8	14.8	14.8	14.8	14.8
3.	Ratio of evaporation of oil to coal = line 2 ÷ line 1 = R - - -	1.97	1.91	1.79	1.74	1.69	1.56	1.48	1.41	1.35
4.	Number barrels oil = to 2,240 pound ton wet coal = 2,240 ÷ (322[1] R) = N - - - - - - - - - - - - - - - - - - -	3.54	3.64	3.90	4.00	4.12	4.46	4.70	4.94	5.15

EQUIVALENT PRICE OF OIL PER BARREL OF 42 U. S. GALLONS = Pc. ÷ N = Po.

5	Price of coal per ton of 2,240 pounds, Pc.	$1 00 - - - -	$0 29	28	26	25	25	23	21	20	19
6		1 50 - - - -	43	41	39	38	36	34	32	30	29
7		2 00 - - - -	56	55	51	50	49	45	43	40	39
8		2 50 - - - -	71	69	64	62	60	56	53	50	40
9		3 00 - - - -	85	82	77	75	73	67	64	60	58
10		3 50 - - - -	99	96	90	87	85	78	75	71	68
11		4 00 - - - -	1 13	1 10	1 02	1 00	97	90	85	81	77
12		4 50 - - - -	1 28	1 23	1 16	1 13	1 09	1 01	96	91	87

*Mechanical stokers and patent furnaces introducing air over fire.

[1]Weight of oil per gallon = 7.66 pounds; weight of oil per barrel of 42 U. S. gallons = 322 pounds.

[2]These figures are net evaporation after allowing for steam consumed to produce the forced draft necessary for burning the fuel.

[3]By "wet coal" is meant coal containing 3% of water.

THE CAMERON REGULAR PATTERN STEAM PUMP

FOR OIL, GAS OR WATER

Fig. 5460

The first seven sizes furnished with hand lever attachment when so desired

Size number	Price with iron water cylinder and steel piston rod	Price with water cylinder lining, piston and piston rod of composition	Diameter of steam cylinder, inches	Diameter of water cylinder, inches	Stroke of piston, inches	Capacity per stroke, gallons	Ordinary speed per minute in strokes	Capacity at ordinary speed per minute, gallons	Steam pipe	Exhaust pipe	Suction pipe	Discharge pipe	Floor space, inches	Weight, lbs.
0	$80 00	$85 00	3½	2	4	.054	150	8	¾	½	1¼	1	32 x 9	135
1	120 00	125 00	4	2	6	.081	150	12	¾	½	1¼	1	40 x 10	210
2	140 00	150 00	5	2½	6	.12	150	18	1	¾	1½	1¼	40 x 11	254
3	165 00	175 00	6	3	7	.21	133	28	¾	1	2	1½	47 x 13	418
3a	185 00	200 00	6	3½	7	.29	133	38	¾	1	2½	2	47 x 15	435
4	210 00	225 00	7	3½	7	.29	133	38	¾	1	2½	2	47 x 15	459
4a	235 00	250 00	7	4	7	.39	133	50	¾	1	2½	2	51 x 16	457
5	275 00	290 00	7	3½	12	.5	100	50	1	1½	3	2½	58 x 17	820
5b	325 00	350 00	7	5	13	1.10	90	100	1	1½	4	3	63 x 20	1,117
6	325 00	340 00	8	4	12	.65	100	65	1	1½	3	2½	58 x 18	864
6a	350 00	375 00	8	5	13	1.10	90	100	1	1½	4	3	63 x 20	1,160
7	375 00	400 00	10	5	13	1.10	90	100	1¼	2	4	3	64 x 21	1,345
8	400 00	425 00	10	6	13	1.59	90	150	1¼	2	4	3½	64 x 21	1,411
9	470 00	520 00	12	7	13	2.16	90	200	1½	2½	5	4	66 x 24	1,928
10a	540 00	575 00	14	8	13	2.83	90	261	2	3	5	5	73 x 26	2,548
10	------	------	14	9	18	4.96	67	330	2	3	6	5	81 x 30	3,126
11	------	------	16	10½	18	6.75	67	450	2½	4	8	6	90 x 37	4,827
12	------	------	18	12	20	9.80	60	587	3	4	10	8	103 x 41	6,360

PARTS FOR CAMERON REGULAR STEAM PUMPS

Size No. of Pump	0	1	2	3	3 a	4	4 a	5	5 b	6	6 a	7	8	9	10	10 a	11	12
Water Cylinder bored, planed, drilled and tapped with studs	$20.00	25.00	30.00	44.00	52.00	52.00	60.00	76.00	110.00	86.00	110.00	110.00	130.00	170.00	250.00	190.00	350.00	450.00
Water Cylinder with seats	25.00	30.00	36.00	52.00	60.00	60.00	68.00	90.00	130.00	100.00	130.00	130.00	150.00	210.00	300.00	230.00	430.00	570.00
Water Cylinder complete except acorn	34.00	39.00	48.00	70.00	78.00	78.00	86.00	130.00	190.00	140.00	190.00	190.00	210.00	280.00	400.00	310.00	580.00	732.00
Water Cylinder complete with acorn	36.50	41.50	51.00	76.00	84.00	84.00	92.00	144.00	210.00	154.00	210.00	210.00	234.00	306.00	450.00	340.00	654.00	820.00
Water Cylinder when brass lined, extra	5.50	6.50	10.00	12.00	13.00	13.00	13.00	20.00	30.00	22.00	30.00	30.00	35.00	46.00	90.00	50.00	110.00	140.00
Water Cylinder suc. flange tapped, back	.....	.....	.....	.....	.....	.....	.....	.90	1.50	.90	1.50	1.50	1.60	2.00	3.00	2.00	5.00	8.00
Water Cylinder suc. flange blank, front	.....	.....	.....	.....	.....	.....	.....	1.60	2.00	1.60	2.00	2.00	2.00	3.00	4.50	3.00	6.00	9.00
Water Cylinder suction plug	.....	.....	.40	.50	.60	.60	.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Water Cylinder cover	1.00	1.00	1.60	2.50	2.50	2.50	2.50	3.50	5.00	3.50	5.00	5.00	5.00	7.00	11.00	11.00	13.00	16.00
Water Cylinder bonnet	2.50	2.50	4.00	5.00	5.00	5.00	5.00	7.00	10.00	7.00	10.00	10.00	10.00	14.00	20.00	14.00	28.00	40.00
Acorn with nozzle	.....	.....	.....	.....	.....	.....	.....	13.00	18.00	13.00	18.00	18.00	22.00	26.00	.....	30.00	.....	.....
Acorn without nozzle	2.50	2.50	3.00	6.00	6.00	6.00	6.00	.....	.....	.....	.....	.....	.....	.....	30.00	.....	50.00	52.00
Discharge Nozzle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18.00	.....	26.00	36.00
Discharge Flange	.....	.....	.....	.....	.....	.....	.....	.90	1.20	.90	1.20	1.20	1.40	1.70	2.00	2.00	3.50	6.00
Plugs for bottom of cylinder	.20	.20	.20	.20	.20	.20	.20	.40	.40	.40	.40	.40	.40	.50	.50	.50	.50	.50
Brass Lining	4.50	5.00	6.00	9.00	10.00	10.00	11.00	14.00	24.00	16.00	24.00	24.00	28.00	36.00	64.00	40.00	80.00	100.00
Water Valves, brass and rubber, per set of 4	4.00	4.00	6.00	10.00	10.00	10.00	10.00	12.00	20.00	12.00	20.00	20.00	20.00	30.00	36.00	30.00	70.00	100.00
Water Valves, refilling, per set of 4	2.00	2.00	3.00	5.00	5.00	5.00	5.00	6.00	8.00	6.00	8.00	8.00	8.00	12.00	16.00	12.00	26.00	44.00
Water Valves, plain rubber, per set of 4	.80	.80	1.40	2.00	2.00	2.00	2.00	4.00	6.00	4.00	6.00	6.00	6.00	10.00	14.00	10.00	24.00	44.00
Water Valve guards, per set of 4	.....	.....	.....	.....	.....	.....	.....	6.00	8.00	6.00	8.00	8.00	8.00	12.00	16.00	12.00	20.00	28.00
Water Valves, plain rubber, per set of 16 No. 7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24.00	24.00
Water Valves, plain rubber, per set of 16 No. 9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40.00
Water Valve guards, per set of 16 No. 7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32.00	32.00
Water Valve guards, per set of 16 No. 9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48.00
Water Valves, metal, per set of 4	2.00	2.00	3.00	4.00	4.00	4.00	4.00	10.00	12.00	10.00	12.00	12.00	12.00	15.00	20.00	15.00	32.00	60.00
Water Valves, leather faced, per set of 4	.....	.....	.....	.....	.....	.....	.....	13.00	17.00	13.00	17.00	17.00	17.00	24.00	35.00	24.00	60.00	88.00
Valve Springs, per set of 4	.60	.60	.60	.80	.80	.80	.80	1.00	1.20	1.00	1.20	1.20	1.20	1.60	2.00	1.60	4.00	5.00
Valve Springs, per set of 16 No. 7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.80	4.80
Valve Springs, per set of 16 No. 9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.40
Valve Seats, 4 to set ..... each	.60	.60	.80	1.20	1.20	1.20	1.20	2.50	3.50	2.50	3.50	3.50	3.50	5.00	8.00	5.00	15.00	19.00
Valve Seats, 16 No. 7 to set ..... each	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.50	3.50
Valve Seats, 16 No. 9 to set ..... each	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.00
Valve Stems, 2 to set ..... each	.60	.60	.80	1.10	1.10	1.10	1.10	1.50	2.00	1.50	2.00	2.00	2.00	2.50	3.00	2.50	5.00	7.00
Valve Stems, 8 No. 7 to set ..... each	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.50	2.50
Valve Stems, 8 No. 9 to set ..... each	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.50

PARTS FOR CAMERON REGULAR STEAM PUMPS

Size No. of Pump	0	1	2	3	3 a	4	4 a	5	5 b	6	6 a	7	8	9	10	10 a	11	12
Plugs with set screws, 2 to set ..... each									$2.00		2.00	2.00	2.00	2.50	3.00	2.50	3.00	3.00
Plugs with set screws, 8 to set ..... each																	3.00	3.00
Plugs without set screws, 2 to set ..... each	$0.60	.60	.60	1.00	1.00	1.00	1.00	1.00		1.00								
Conical Valve Springs, per set of 4								2.00	2.50	2.00	2.50	2.50	2.50	3.00	5.00	3.00	10.00	
Water Piston complete, brass	2.20	2.60	3.00	4.00	5.00	5.00	7.00	6.50	10 50	7.50	10.50	10.50	13.00	18.00	44.00	38.00	55.20	73.20
Water Piston Head	1.40	1.70	2 00	2.50	3.00	3.00	4.50	4.00	7.00	5.00	7.00	7.00	8.50	13.00	28.00	24.00	36.00	44.00
Water Piston Follower	.80	.90	1.00	1.50	2.00	2.00	2.50	2.50	3.50	2.50	3.50	3.50	4.50	5.00	10.00	8.00	12.00	18.00
Water Piston Iron Head															11.00	9.00	14.00	18.00
Water Piston and Brass Follower complete															26.00	23.00	33.20	46.00
Water Piston Bolts ..... each															1.20	1.20	1.20	1.60
Water Piston Nuts ..... each				.60	.60	.60	.60	.80	1.00	.80	1.00	1.00	1.00	1.00	1.50	1.50	2.50	2.50
Steel Set Screws for valve stem plugs									.20		.20	.20	.20	.20	.20	. 0	.20	.20
Brass Set Screws for valve stem plugs									.30		.30	.30	.30	.30	.30	.30	.30	.30
Steam Cylinder, bored, planed, drilled, and tapped	14.00	20.00	25.50	34.00	34.00	40.00	40.00	60.00	60.00	70.00	70.00	90.00	90.00	110.00	140.00	130.00	174.00	220.00
Steam Cylinder complete with steam chest	30.00	45.00	50.00	70.00	70.00	76.00	76.00	104.00	104.00	116 00	116.00	152.00	152.00	174.00	220.00	210.00	266.00	312 00
Steam Cylinder complete with steam chest and cover	40.00	56.00	64.00	84.00	84.00	92.00	92.00	128.00	128.00	140.00	140.00	190.00	190.00	210.00	266.00	256.00	320.00	376.00
Steam Cylinder complete with steam chest and body	60.00	80.00	92.00	130.00	130.00	140.00	140.00	180.00	180.00	196.00	196.00	260.00	260.00	300.00	380.00	370.00	450.00	540.00
Exhaust Flange																	4.50	4.50
Steam Chest, bored, planed, drilled, and tapped	9.00	14.00	14.00	21.00	21.00	21.00	21.00	23.50	23.50	23.50	23.50	32.00	32.00	32.00	40.00	40.00	50.00	50.00
Steam Chest complete, without slide valve	15.00	24.00	24.00	34.00	34.00	34.00	34.00	40.00	40.00	40 00	40.00	55.00	55 00	55.00	66.00	66.00	76.00	76.00
Steam Chest complete, with slide valve	16.20	25.60	25.60	36.50	36.50	36.50	36.50	43.00	43.00	43.00	43.00	59.50	59.50	59.50	72.50	72.50	83.50	84.00
Steam Chest Plunger—rough	.80	1.00	1.00	1.50	1.50	1.50	1.50	2.00	2.00	2.00	2.00	2.74	2.74	2.74	4 00	4.00	5.00	5.00
Steam Chest Plunger—finished	2.50	4.80	4.80	6.00	6.00	6.00	6 00	6.00	6.00	6.00	6.00	8.00	8.00	8.00	10.00	10.00	13.00	13.00
Steam Chest Cover ..... each	.40	.60	.60	1.00	1.00	1.00	1.00	1 50	1.50	1.50	1.50	2.00	2.00	2.00	2 50	2.50	2.50	2.50
Steam Chest Stuffing Box complete	1.50	2.00	2.00	2.30	2 30	2.30	2.30	2.30	2.30	2.30	2.30	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Steam Chest Stuffing Box Bottom	1.00	1.34	1.34	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Steam Chest Stuffing Box Cap	.50	.66	.66	.80	.80	.80	.80	.80	.80	.80	.80	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Steam Chest Crank	.60	.80	.80	1.50	1.50	1.50	1.50	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Steam Chest Crank Handle	.50	.50	.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Steam Chest Crank Handle Nuts	.20	.20	.20	.24	.24	.24	.24	.24	.24	.24	.24	.40	.40	.40	.40	.40	.40	.40
Steam Chest Crank Handle and Nut complete	1.30	1.50	1.50	2.74	2.74	2.74	2.74	3.24	3 24	3.24	3.24	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Slide Valve	1.20	1 60	1 60	2.50	2.50	2.50	2 50	3.00	3.00	3.00	3.00	4.50	4.50	4.50	6.50	6.50	7.50	8.00
Body Piece complete	20.00	24.00	28.00	40.00	40.00	44.00	44.00	50.00	50.00	54.00	54.00	70.00	70.00	84.00	110.00	110.00	130.00	160.00

PARTS FOR CAMERON REGULAR STEAM PUMPS

Size No. of Pump	0	1	2	3	3 a	4	4 a	5	5 b	6	6 a	7	8	9	10	10 a	11	12
Body Piece Stuffing Box complete (2) each	$ 2.00	2.60	2.60	5.00	5.00	5.00	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Body Piece Stuffing Box bottom (2) each	1.00	1.20	1.20	2.50	2.50	2.50	2.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Body Piece Stuffing Box cap (2) each	.70	1.00	1.00	1.50	1.50	1.50	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Body Piece Stuffing Box thimble (2) each	.30	.40	.40	1.00	1.00	1.00	1.00	1.20	1.20	1.20	1.20	1.50	1.50	2.00	2.20	2.20	2.50	2.70
Body Piece Stuffing Box gland (2) each	.....	.....	.....	.....	.....	.....	.....	2.00	2.00	2.00	2.00	2.50	2.50	3.50	4.00	4.00	5.00	5.50
Body Piece Stuffing Box gland, bolts and nuts (4) each	.....	.....	.....	.....	.....	.....	.....	.36	.36	.36	.36	.40	.40	.50	.50	.50	.74	.74
Body Piece without fittings	11.00	14.00	16.00	22.00	22.00	26.00	26.00	34.00	34.00	38.00	38.00	48.00	48.00	60.00	80.00	80.00	92.00	120.00
Steam Cylinder Cover complete	9.00	11.00	12.00	14.00	14.00	16.00	16.00	22.00	22.00	23.00	23.00	30.00	30.00	34.00	44.00	44.00	50.00	60.00
Steam Cylinder Cover without fittings	5.00	6.00	7.00	8.50	8.50	10.50	10.50	15.00	15.00	16.00	16.00	20.00	20.00	24.00	30.00	30.00	34.00	40.00
Hand Gear Lever	2.00	2.00	2.00	2.50	2.50	2.50	2.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reversing Valves (2) each	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	3.50	3.50	5.50	4.50	4.50	4.50	6.00
Reversing Valve bushing (2) each	1.74	2.00	2.00	2.00	2.00	2.00	2.00	3.50	3.50	3.50	3.50	4.50	4.50	4.50	6.00	6.00	6.00	7.50
Reversing Valve plug (2) each	.60	.80	.80	.80	.80	.80	.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reversing Valve cap (2) each	.....	.....	.....	.....	.....	.....	.....	1.00	1.00	1.00	1.00	1.24	1.24	1.24	1.50	1.50	1.50	2.00
Steam Piston ring and spring pattern complete	6.50	8.00	10.00	12.00	12.00	14.00	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston head	2.00	2.50	3.20	4.00	4.00	4.50	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston follower	2.00	2.50	3.20	4.00	4.00	4.50	4.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston ring with wedge and spring	2.40	3.00	3.50	4.00	4.00	5.00	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston ring only	1.60	2.00	2.50	3.00	3.00	4.00	4.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston ring wedge	.40	.50	.50	.50	.50	.50	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston ring spring	.40	.50	.50	.50	.50	.50	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston nut	.40	.40	.40	.50	.50	.50	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Steam Piston bull ring pattern, complete	.....	.....	.....	.....	.....	.....	.....	20.00	20.00	24.00	24.00	32.00	32.00	40.00	54.00	54.00	64.00	84.00
Steam Piston head	.....	.....	.....	.....	.....	.....	.....	5.00	5.00	5.50	5.50	7.50	7.50	9.50	20.00	20.00	25.00	35.50
Steam Piston follower	.....	.....	.....	.....	.....	.....	.....	5.00	5.00	5.50	5.50	7.50	7.50	9.50	10.00	10.00	12.00	16.00
Steam Piston bull ring	.....	.....	.....	.....	.....	.....	.....	3.50	5.50	4.00	4.00	5.50	5.50	6.00	8.00	8.00	9.00	12.50
Steam Piston Packing ring each	.....	.....	.....	.....	.....	.....	.....	3.00	5.00	5.74	5.74	5.50	5.50	6.00	8.00	8.00	9.00	11.00
Steam Piston nut	.....	.....	.....	.....	.....	.....	.....	.50	.50	.50	.50	.60	.60	.70	2.50	2.50	4.00	4.00
Brass Piston Rod, with nuts	4.40	6.40	6.40	10.10	10.10	10.10	10.10	16.30	17.50	16.30	17.50	28.60	28.60	34.70	49.50	48.00	69.00	85.00
Brass Piston Rod, without nuts	4.00	6.00	6.00	9.00	9.00	9.00	9.00	15.00	16.00	15.00	16.00	26.00	26.00	32.00	44.00	42.00	60.00	76.00
Steel Piston Rod, with nuts	3.40	4.40	4.40	6.10	6.10	6.10	6.10	8.30	9.50	8.30	9.50	13.60	13.60	16.70	23.50	23.00	30.00	35.00
Steel Piston Rod, without nuts	3.00	4.00	4.00	5.00	5.00	5.00	5.00	7.00	8.00	7.00	8.00	11.00	11.00	14.00	18.00	17.00	22.00	26.00

THE CAMERON BOILER FEED STEAM PUMP

PISTON PATTERN

Not illustrated

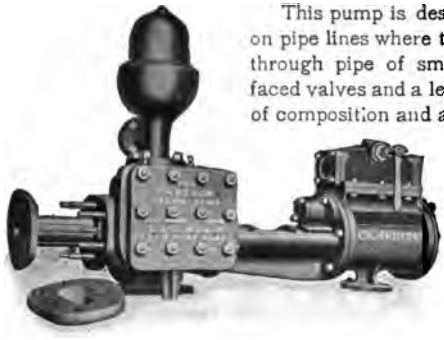
The main difficulty met with in fixing on the proper size of pump to recommend is that the horse power of the boiler for which the pump is required, is about all the information furnished. The expression "horse power" as applied to boilers, is a very indefinite term; what should be given, if possible, is the quantity of feed water required, and a pump which will supply this quantity at about one-half its rated capacity at ordinary speed will be right for cold water, and say one-third speed for hot water.

In feeding hot water the pump should be placed below the source of supply. The first six sizes furnished with hand-lever attachment when so desired.

Size number	Price with iron water cylinder and steel piston rod	Price with water cylinder lining, piston and piston rod of composition	Diameter of steam cylinder, inches	Diameter of water cylinder, inches	Stroke of piston, inches	Capacity at ordinary speed per minute, gallons	Boilers in horse power they will supply at ½ ordinary speed, based on 30 lbs. of water per horse power per hour	Steam pipe	Exhaust pipe	Suction pipe	Discharge pipe	Floor space, inches	Weight, lbs.
0	$80 00	$85 00	3½	2	4	8	40	¾	½	1¼	1	32 x 9	136
1	120 00	125 00	4	2	6	12	60	¾	½	1¼	1	40 x 10	210
2	140 00	150 00	5	2½	6	18	90	½	¾	1½	1¼	40 x 11	254
2a	150 00	165 00	5	3	7	28	140	½	¾	2	1½	47 x 12	347
2b	160 00	170 00	5	3½	7	38	190	½	¾	2½	2	47 x 14	355
3b	210 00	225 00	6	4	7	50	250	¾	1	2½	2	47 x 14	422
3c	210 00	225 00	6	3½	12	50	250	¾	1	3	2½	58 x 17	520
3d	230 00	245 00	6	4	12	65	325	¾	1	3	2½	58 x 17	525
5a	280 00	310 00	7	4½	12	80	400	¾	1	3	2½	58 x 18	725
5b	325 00	350 00	7	5	13	100	500	1	1½	4	3	63 x 20	1117
--	375 00	400 00	8	6	13	150	750	1	1½	4	3½	64 x 21	1202
--	425 00	465 00	9	7	13	200	1000	1	1½	5	4	66 x 24	1680
--	445 00	490 00	10	7	13	200	1000	1¼	2	5	4	66 x 24	1770
--	500 00	530 00	12	8	13	261	1300	1½	2½	5	5	73 x 26	2010
--	------	------	14	9	18	330	1600	2	3	6	5	81 x 30	3125
--	------	------	14	10	18	400	2000	2	3	6	5	81 x 30	3300
--	------	------	16	10½	18	450	2300	2½	4	8	6	90 x 37	4827
--	------	------	16	12	20	587	3000	2½	4	10	8	103 x 41	5140

THE CAMERON OIL LINE PUMP

Fig. 5462



This pump is designed for handling crude or refined petroleum on pipe lines where the oil must be pumped a considerable distance through pipe of small diameter. It is fitted with either leather-faced valves and a leather cup piston for handling cold oil, or valves of composition and a hemp-packed piston for pumping oil at a high temperature. We supply this pump with a plain iron water cylinder, or fitted with a removable composition bushing of a peculiar form best adapted for this class of work. Bronze piston rods are supplied on all. The cut shows pump with composition bushing. This style of composition bushing is furnished on some sizes only, the bushings of other sizes being made without flange.

Price, with iron oil cylinder and composition piston rod	Price, with piston rod and removable bushing of composition	Diameter of steam cylinder, inches	Diameter of oil cylinder, inches	Stroke of piston, inches	Capacity per stroke, gallons	Capacity at ordinary speed per minute, gallons	Steam pipe	Exhaust pipe	Suction pipe	Discharge pipe	Weight, lbs.
$175 00	195 00	6	3	7	.21	28	¾	1	2	1½	445
215 00	235 00	7	3	7	.21	28	¾	1	2	1½	470
280 00	300 00	7	3½	12	.50	50	1	1½	3	2	820
330 00	350 00	8	3	12	.36	40	1	1½	3	2	938
440 00	475 00	10	3	13	.39	40	1¼	2	3	2	1,745
440 00	475 00	10	3½	13	.54	50	1¼	2	3	2	1,783
440 00	475 00	10	4	13	.70	65	1¼	2	3	2	1,760
440 00	475 00	10	4½	13	.90	80	1¼	2	3	2	1,760
440 00	475 00	10	5	13	1.10	100	1¼	2	4	3	1,345
515 00	550 00	12	3	13	.39	40	1½	2½	3	2	1,890
515 00	550 00	12	3½	13	.54	50	1½	2½	3	2	1,930
515 00	550 00	12	4	13	.70	65	1½	2½	3	2	1,794
515 00	550 00	12	4½	13	.90	80	1½	2½	3	2	1,758
515 00	550 00	12	5	13	1.10	100	1½	2½	4	3	2,309
650 00	725 00	12	3	25	.75	40	1½	2½	4	3	2,600
650 00	725 00	12	3½	25	1.04	50	1½	2½	4	3	2,600
650 00	725 00	12	4	25	1.35	65	1½	2½	4	3	2,600
650 00	725 00	12	4½	25	1.72	80	1½	2½	4	3	2,600
650 00	725 00	12	5	25	2.12	100	1½	2½	4	3	2,600
650 00	725 00	12	6	25	3.00	150	1½	2½	5	4	3,200
725 00	800 00	14	3½	25	1.04	50	2	3	4	3	3,100
725 00	800 00	14	4	25	1.35	65	2	3	4	3	3,100
725 00	800 00	14	4½	25	1.72	80	2	3	4	3	3,500
725 00	800 00	14	5	25	2.12	100	2	3	4	3	3,483
725 00	800 00	14	6	25	3.00	150	2	3	5	4	3,500
1,025 00	1,100 00	16	4	25	1.35	65	2½	4	4	3	4,200
1,025 00	1,100 00	16	4½	25	1.72	80	2½	4	4	3	4,200
1,025 00	1,100 00	16	5	25	2.12	100	2½	4	4	3	4,204
1,025 00	1,100 00	16	6	25	3.00	150	2½	4	5	4	4,205
1,125 00	1,225 00	18	4	25	1.35	65	3	4	4	3	5,700
1,125 00	1,225 00	18	4½	25	1.72	80	3	4	4	3	5,700
1,125 00	1,225 00	18	5	25	2 12	100	3	4	4	3	5,700
1,125 00	1,225 00	18	6	25	3.00	150	3	4	5	4	5,700

THE SNOW "PISTON PRESSURE" PUMPS

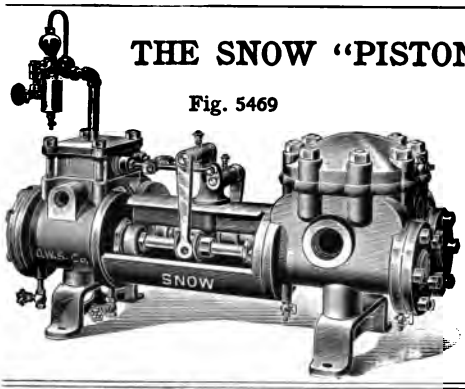


Fig. 5469

VALVE-PLATE STYLE

This pump is designed for working against a water pressure of 500 pounds per square inch. It differs from the regular "pressure" pump in that it has no outside packed plungers, but a piston packed with fibrous packing.

The pump cylinders are brass lined, unless ordered otherwise. These pumps are used extensively on oil lines and are especially adapted for pumping heavy oil.

Diameter of steam cylinders	Diameter of pump pistons	Length of stroke	Gallons per revolution	Proper number of revolutions per minute	Gallons per minute	DIAMETER OF PIPES, INCHES				Weight, lbs.	Price	Brass Fittings *(See Note)
						Steam	Exhaust	Suction	Delivery			
6	2½	6	.49	50 to 80	24.5 to 39.2	1	1½	2½	2	800	$140 00	10 65
6	3	6	.7	50 to 80	35 to 56	1	1½	2½	2	800	140 00	10 65
6	3½	6	.96	50 to 80	48 to 76.8	1	1½	2½	2	800	150 00	10 65
7	2½	8	.65	45 to 70	29.3 to 45.5	1¼	2	2½	2	950	215 00	16 00
7	3	8	.94	45 to 70	42.3 to 65.8	1¼	2	2½	2	950	215 00	16 00
7	3½	8	1.27	45 to 70	57.2 to 89	1¼	2	2½	2	950	230 00	16 00

Sizes are designated by the diameter of the steam cylinders, the diameter of the pump pistons and the length of stroke. When pumps are fitted with brass piston rods a slight extra charge is made. NOTE.—One revolution means four strokes.

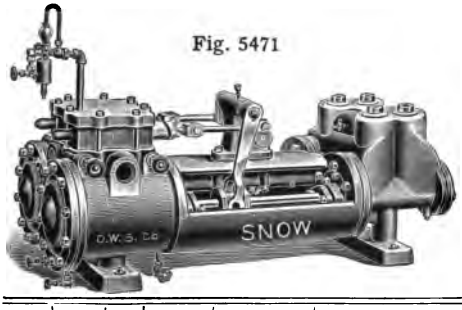


Fig. 5471

VALVE-POT STYLE

This pump is designed for working against heavy pressures ranging from 300 to 1,000 pounds per square inch. It differs from the "piston pressure" pump with valve-plate in that it has regular pot valves accessible from the outside. The pump cylinders are brass lined, unless ordered otherwise.

The pumps are used extensively on oil lines and are especially adapted for pumping oil under heavy pressure.

Diameter of steam cylinders	Diameter of pump pistons	Length of stroke	Gallons per revolution	Proper number of revolutions per minute	Gallons per minute	DIAMETER OF PIPES, INCHES				Weight, lbs.	Price	Brass Fittings *(See Note)
						Steam	Exhaust	Suction	Delivery			
6	2½	6	.49	50 to 80	24.5 to 39.2	1	1½	2½	2	900	$200 00	10 65
6	3	6	.7	50 to 80	35 to 56	1	1½	2½	2	900	200 00	10 65
6	3½	6	.96	50 to 80	48 to 76.8	1	1½	3	2	900	220 00	10 65
8	3	10	1.18	40 to 65	47.2 to 76.7	1½	2	3	2	1,900	460 00	26 65
10	3	10	1.18	40 to 65	47.2 to 76.7	2	2½	3	2	2,000	490 00	26 65
8	3½	10	1.6	40 to 65	64 to 104	1½	2	3	2	1,900	460 00	26 65
10	3½	10	1.6	40 to 65	64 to 104	2	2½	3	2	2,000	490 00	26 65
8	4½	10	2.64	40 to 65	105.6 to 171.6	1½	2	4	3	1,900	490 00	33 35
10	4½	10	2.64	40 to 65	105.6 to 171.6	2	2½	4	3	2,000	520 00	33 35

Sizes are designated by the diameter of the steam cylinders, the diameter of the pump pistons and the length of stroke. When pumps are fitted with brass piston rods a slight additional charge is made. NOTE.—One revolution means four strokes. Pump pressures in table are based on a pressure of 100 pounds in steam cylinders.

* If Pumps with brass fittings are desired, add list price of Brass Fittings to net price of regular Pumps.

THE SNOW DUPLEX BOILER-FEED PUMP

Fig. 5467

OF SMALL SIZE, 1906 MODEL

This pump is the latest design of boiler feeder and for general service duty up to 150 pounds per square inch working pressure.

Sizes are designated by the diameter of the steam cylinders, the diameter of the pump plungers and the length of stroke.

Bed plates extra. When pumps are fitted with piston rods, a slight extra charge is made.

NOTE.—One revolution means one complete circuit of the motion of any of the reciprocating parts, and for a duplex pump is equivalent to four single strokes.

Diameter of steam cylinders	Diameter of pump plungers	Length of stroke	Gallons per revolution	Proper number of revolutions per minute	Gallons per minute	DIAMETER OF PIPES, INCHES				Weight, lbs.	Price	Brass fittings *(See Note)
						Steam	Exhaust	Suction	Discharge			
2	1⅛	2¾	.44	80 to 150	3.5 to 7.6	¾	½	1	¾	75	$45 00	- - - -
3	2	3	.156	50 to 125	7 8 to 19.5	¾	½	1¼	1	120	55 00	$3 00
4½	2¾	4	.392	50 to 100	19.6 to 39.25	¾	1	2	1½	320	90 00	7 00
5½	3½	5	.795	50 to 90	39.75 to 71.55	¾	1¼	2½	2	500	120 00	9 35
6	4	6	1.25	50 to 80	62.5 to 100	1	1½	3	2	650	140 00	12 00
7½	4½	6	1 59	50 to 80	79.5 to 127.2	1½	2	4	3	800	195 00	18 65

*If Pumps with brass fittings are desired, add list price of Brass Fittings to net price of regular Pumps.

THE MARSH BOILER-FEED PUMP

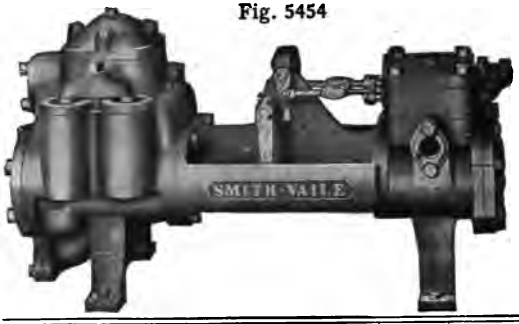
Fig. 5487

WITH HAND PUMPING ATTACHMENT

Fig. 5488

Size	Steam Cylinder	Water Cylinder	Stroke	Gallons per hour	Floor space, inches	Weight, lbs.	Price, Fig. 5487	Price, Fig. 5488
B	2½	1¼	2	200	7 x 12	40	$30 00	$35 00
BB	3	1½	2½	400	8 x 16	75	50 00	55 00
C	4	2⅜	3	650	10 x 21	145	75 00	85 00
D	5	3	3½	1,000	11 x 23	190	100 00	110 00

Fig. 5454



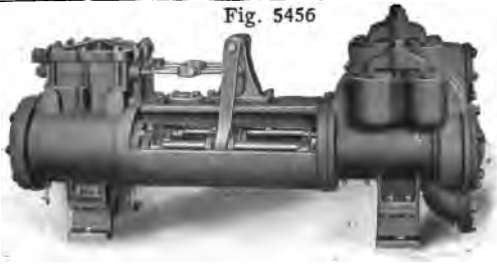
SMITH-VAILE PUMP

DUPLEX PATTERN

PISTON PACKED TYPE

Diameter of steam cylinders, in.	Diameter of water cylinders, in.	Stroke, inches	Gallons, per revolution	Steam pipe, inches	Exhaust pipe, inches	Suction pipe, inches	Discharge pipe, in.	Weight, lbs.	Price	Brass Fittings
3	2	4	.2	¼	⅜	1¼	1	255	$43 50	$3 25
4½	2¾	4	.48	⅜	1	2	1½	560	65 00	7 50
5¼	3½	5	.8	⅜	1¼	2½	2	810	90 00	10 00
6	4	6	1.32	1	1½	3	2	900	100 00	14 00
7	4½	6	1.32	1	1½	3	2	1,300	152 00	20 00
7	4	10	2.17	1¼	2	4	3	1,350	175 00	30 00
7	4½	10	2.76	1¼	2	4	3	1,350	185 00	30 00
7	5	10	3.4	1¼	2	4	3	1,825	210 00	35 00
8	5	10	3.4	1½	2	4	3	1,845	220 00	35 00
9	6	10	4.88	1½	2	5	4	1,955	250 00	50 00
10	6	12	5.84	2	2½	5	4	2,650	290 00	55 00
10	7	12	7.9	2½	3	6	5	3,600	350 00	55 00
12	8	12	10.4	2½	3	6	5	4,050	450 00	70 00
14	10	12	10.4	2½	3	6	5	5,700	600 00	80 00

Fig. 5456



KNOWLES SPECIAL DUPLEX PUMP

PRESSURE PATTERN

FOR

BOILER FEEDING, ETC.

Steam Cylinders, inches	Water Cylinders, inches	Stroke, inches	Capacity in gallons per stroke each piston	Steam pipe, inches	Exhaust pipe, inches	Suction pipe, inches	Discharge pipe, inches	Weight, lbs.	Price	Price brass fitted
3	2	3	.16	⅜	½	1¼	1	150	$55 00	$60 00
4½	2¾	4	.40	½	¾	2	2	320	90 00	100 00
5¼	3½	5	.80	¾	1½	2½	2½	435	120 00	130 00
6	4	6	1.32	1	1½	3	3	565	140 00	156 00
7½	5	6	2.04	1½	1½	4	3	850	195 00	220 00
7½	4½	10	2.76	1¼	1½	4	3	970	275 00	320 00
8	5	10	3.40	1½	2	4	3	1,875	365 00	------
10	6	10	4.88	1½	2	5	4	1,500	415 00	490 00
10	6	12	5.88	1½	2	5	4	2,700	510 00	------
10	7	10	6.64	1½	2	6	5	2,550	515 00	600 00
12	7	10	6.64	2½	3	6	5	3,660	615 00	690 00
14	10¼	10	14.28	2½	3	8	7	5,145	800 00	910 00

The 8 x 5 x 10 and 10 x 6 x 12 pumps of these patterns are used extensively in connection with the hydraulic rotary drilling system.

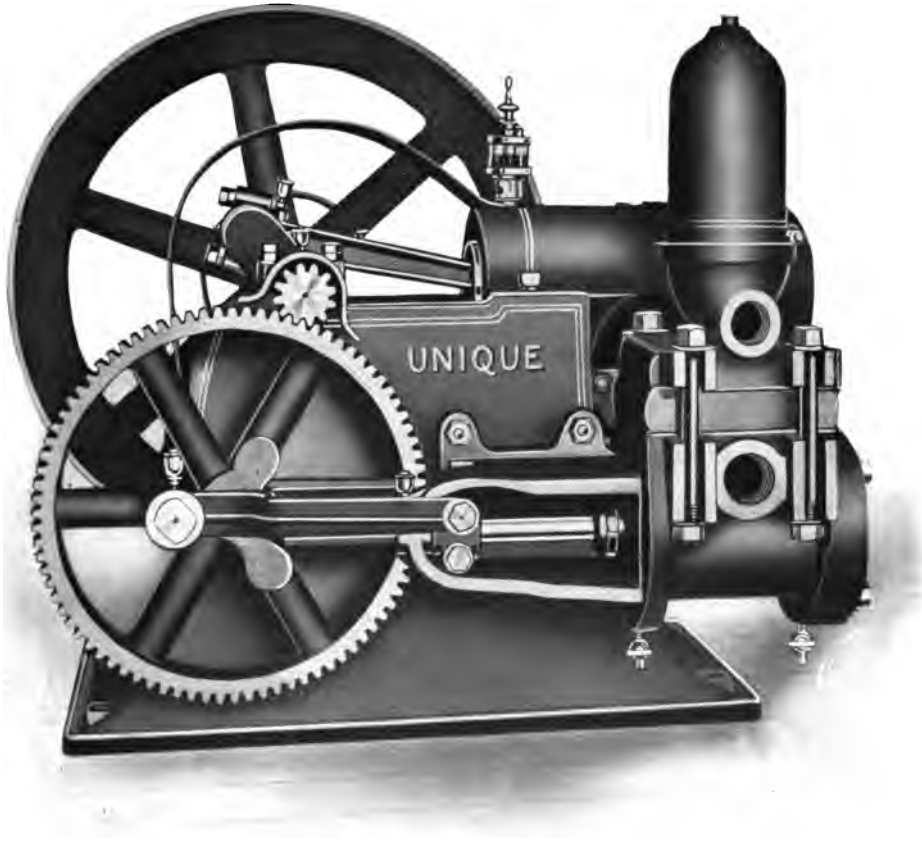
THE FAIRBANKS-MORSE DUPLEX BOILER FEED PUMP

Fig. 5455

Diameter of steam cylinders, inches	Diameter of water cylinder, inches	Length of stroke, inches	Gallons per stroke	DIAMETER OF PIPES, INCHES				Weight, lbs.	Price
				Steam	Exhaust	Suction	Discharge		
3	2	4	.05	⅜	½	1¼	1	210	$55 00
4½	3	4	.12	½	¾	2	1½	350	90 00
5¼	3¾	5	.20	1	1½	2½	1½	490	120 00
6	4	6	.33	1	1½	3	2	640	140 00
7	4½	7	.48	1½	2	4	3	990	195 00
7	4½	10	.69	1½	2	4	3	1,375	275 00
8	5	12	1.02	1½	2	4	3	1,610	300 00
10	6	12	1.47	2	2½	5	4	3 125	440 00

GAS ENGINE AND PUMP COMBINED

"UNIQUE". Fig. 5489

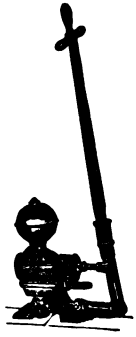


The pump will lift 40 barrels per hour to a height of 150'. It is direct connected to engine, but can be easily disconnected within one minute's time. It is an engine used for electric light or general power purposes. The engine is fitted with an 8" pulley, 4" face and has a speed from 325 to 425 revolutions per minute. The suction pipe is 1½" and discharge 1¼" in diameter. It is automatically governed. For water supply, fire purposes, in mills, factories, country places, farm or home it stands without a peer.

Weight 500 lbs.

Further information on application.

Fig. 5452



"JUPITER" DOUBLE-ACTING FORCE PUMP

With air chamber and adjustable lever, especially adapted for elevating water from cisterns, etc., to tanks in upper stories of residences; also used largely for cleaning and filling boilers and for fire protection. Brass plugs are provided for draining cylinder to prevent freezing and for priming when necessary.

No.	Diameter cylinder, inches	Stroke, inches	Suction fitted for pipe, inches	Discharge fitted for pipe, inches	Weight, lbs.	Iron	Brass lined cylinder
1	2½	5	1¼	1	56	$16 00	18 00
2	3	5	1½	1¼	63	18 00	21 00

PARTS FOR "JUPITER" DOUBLE-ACTING FORCE PUMP

For number	1	2	For number	1	2
Cylinder	$4 00	5 00	Lever	$1 75	1 75
Lower valve chest	1 50	1 50	Lever socket	50	50
Front head	1 00	1 00	Link	25	25
Back head	75	75	Brass valves - each	75	75
Base	1 50	1 50	Suction tube and nut	1 00	1 00
Air chamber	1 50	1 50	Discharge nut and tube	90	1 00
Plunger	1 00	1 00	Brass stuffing box	40	40
Piston rod	3 00	3 00			

Fig. 5453

THE MEYERS LOW DOWN DOUBLE-ACTING FORCE PUMP

Weight, 87 lbs.

Complete with hose nipple, hose attachment. hose band and strainer.. $15 00

STEAM JET PUMP

JARECKI PATTERN

Fig. 5449

Size - - - - - inches	1	1¼
Weight - - - - - lbs.	----	----
Price	$5 00	7 50

Fig. 5445

STEAM JET PUMP

OIL WELL SUPPLY PATTERN

Size of pump - - - - inches	¾	1	1¼	1½	2	2½	3
Suction pipe - - - - inches	¾	1	1¼	1½	2	2½	3
Discharge pipe - - - inches	½	¾	1	1¼	1½	2	2½
Steam pipe - - - - inches	⅜	½	½	¾	¾	1	1
Steam opening - - - inches	3/16	4/16	5/16	6/16	7/16	8/16	9/16
Capacity per minute - - gallons	8	15	20	30	40	50	60
Weight - - - - - - - lbs.	**4**	**6**	**8**	**12**	**16**	**24**	**33**
Complete - - - - - - -	$8 00	10 00	12 00	14 00	16 00	20 00	24 00
Nuts - - - - - - - - each	50	50	75	75	1 00	1 50	1 50
Malleable nipples - - - each	25	25	35	35	60	75	1 00
Combination pipe(loose tubes)each	75	75	75	1 00	1 00	1 50	1 50
Steam tubes (tight tubes) - each	25	50	50	60	60	75	75

Fig. 5447

JET PUMP FOR DRIVE WELLS

No.	Suction, inches	Delivery, inches	Discharge, inches	Size of pipe it will go in, inches	Delivery per hour in gallons	Price	Weight, lbs.
1	1	¾	½	3	500	$7 50	1.5
2	1¼	1	¾	3½	1,000	10 00	2
3	1½	1¼	1	4	1,500	12 50	3
4	2	1½	1¼	5	2,000	15 00	3.8

GEOLOGICAL FORMATIONS OR "SANDS" IN WHICH OIL AND GAS ARE FOUND IN EASTERN AND CENTRAL NORTH AMERICA

	Geological Series or Group	Producing Horizons	Locality Where Productive	Approx. depth below Pittsburgh Coal Feet
CARBONIFEROUS	Lower Barren Coal Measures	Goose Run Sand	S. E. Ohio	100 ft. above
		Pittsburgh Coal	Not Productive	0
		Connellsville Sand	West Virginia	40
		Morgantown Sand	West Virginia	80
		Macksburg Sandstone	S. E. Ohio	200
		Hurry-up Sand	S. W. Penna. and W. Va.	300
	Lower Productive Coal Measures	First Cow Run Sand	S. W. Penna. and W. Va.	320
		Mahoning Sandstone	S. W. Penna. and W. Va.	350
		Middle Cow Run Sand or Freeport Sandstone	S. W. Penna., West Va. and S. E. Ohio	450
		Upper Second Cow Run Sand	S. W. Penna., West Va. and S. E. Ohio	600
		Lower Second Cow Run Sand	S. W. Penna., West Va. and S. E. Ohio	650
	Pottsville	Tionesta, Homewood or 700 ft. Macksburg Sand	S. W. Penna., West Va., S. E. Ohio and Kentucky	850
		Upper Connoquenessing 800 ft. Macksburg Sand or Upper Salt Sand	S. W. Penna., West Va., S. E. Ohio and Ky.	925
		Lower Connoquenessing or Middle Salt Sand	S. W. Penna., West Va., S. E. Ohio and Ky.	1,000
		Lower Salt Sand, Sharon or Olean Conglomerate or Maxon Sand	S. W. Penna., West Va., S. E. Ohio, Kansas and Indian Ter.	1,080
	Mauch Chunk	Keener Sandstone	S. E. Ohio and West Va.	1,275
	Pocono	Big Injun Sand	S. W. Penna., West Va., S. E. Ohio and Ky.	1,340
		Squaw Sand	S. W. Penna., West Va., S. E. Ohio and Ky.	1,425
DEVONIAN	Upper Devonian	Upper Gas Sand	S. W. Pennsylvania	1,535
		Berea Grit or Butler County Gas Sand	S. W. Penna., West Va., S. E. Ohio and Ky.	1,700
		Devonian or Ohio Shales (Gas)	New York, N. W. Pa., Ky., N. E. Ohio and So. Ind.	1,780
		First, 100 foot or Gantz Sand	W. Penna., West Va. and S. E. Ohio	1,850
		50 foot or Red Valley Sand	W. Penna. and W. Va.	1,885
		Second or 30 foot Sand	W. Penna. and W. Va.	2,000
		Stray or Bowlder Sand	W. Penna. and W. Va.	2,050
		Third or Gordon Sand	W. Penna., West Va. and S. E. Ohio	2,130
		Stray Third Sand	W. Penna. and W. Va.	2,150
		Fourth Sand	S. W. Penna. and W. Va.	2,200
		Fifth Sand	S. W. Penna. and W. Va.	2,260
		Bayard Sand	S. W. Penna. and W. Va.	2,420

GEOLOGICAL FORMATIONS OR "SANDS" IN WHICH OIL AND GAS ARE FOUND IN EASTERN AND CENTRAL NORTH AMERICA—Concluded

	Geological Series or Group	Producing Horizons	Locality where Productive	Approx. depth below Pittsburgh Coal Feet
DEVONIAN	Middle Devonian	Sixth or Elizabeth Sand	S. W. Penna. and W. Va.	2,590
		Warren First Sand	N. W. Pennsylvania	2,700
		Warren Second Sand	N. W. Pennsylvania	2,815
		Warren Third Sand	N. W. Pennsylvania	2,900
		Clarendon Tiona Sand	N. W. Pennsylvania	2,950
		Speechley Sand	N. W. Pennsylvania	3,020
		Cherry Grove or Garfield Sand	N. W. Penna. and W. New York	3,150
		Sheffield or Gusher City Sand	N. W. Penna. and W. New York	3,350
		Deer Lick Sand	N. W. Penna. and W. New York	3,420
		Bradford Sand	N. W. Penna. and W. New York	3,460
		Waugh and Porter Sands	N. W. Penna. and W. New York	3,600
		Elk County Sand	N. W. Penna. and W. New York	3,670
		Kane Sand	N. W. Penna. and W. New York	3,860
	Lower Devonian	Black Shales	N. W. Ky. and So. Ind.	5,325
		Hamilton Limestone	Petrolia and Oil Springs, Ontario, Canada	5,330
		Carniferous Limestone	N. E. and Central Ohio, W. N. Y., and Petrolia and Oil Springs, Ontario	5,625
SILURIAN		Oriskany Sandstone	N. Y., So. Indiana, Ontario	5,660
		Guelph Limestone	So. Ontario and W. N. Y.	5,700
		Niagara Limestone	W. N. Y., Ind. and Ontario	5,820
		Clinton Limestone	Cen. Ohio and Welland County, Ontario	5,985
		Clinton Sandstone		6,025
	Silurian	Medina Red Sandstone	W. N. Y. and Welland County, Ontario	6,085
		Medina Upper White Sand	W. N. Y. and Welland County, Ontario	6,185
		Medina Lower White Sand	W. N. Y. and Welland County, Ontario	6,240
		Upper Trenton Limestone	N. W. O., Ind. and Ky.	8,700
		Lower Trenton Limestone	W. N. Y. and Welland County, Ontario	9,200
CAMBRIAN	Cambro-Silurian	Calciferous and Potsdam Sandstone	W. N. Y., Ga., Ala., Ontario, Canada	
	Cambrian	Quebec Group	Newfoundland	9,230

SPECIFIC GRAVITY OF CRUDE OIL AND METHOD OF FINDING IT

The instruments used are a hydrometer and a standard thermometer. The hydrometer, which is a glass column marked with graduations from 10 to 100, was invented by Antoine Beaume, a French chemist, and the scale on the instrument has always borne his name. The hydrometer when placed in a jar or a bottle of oil, sinks to the point on the scale which indicates the gravity in degrees Beaume. The basis of temperature for testing oil is 60 degrees Fahrenheit and for oil at a greater or less temperature, variations must be calculated. Hydrometers are usually provided with a special scale for figuring temperature variations. The specific gravity is found by dividing 140 by 130 plus the Beaume degrees, for example: if the hydrometer registers 30°, this added to 130 equals 160, which divided into 140 shows specific gravity .875°.

Following is a table showing Beaume degrees, specific gravity and weight per gallon of oil.

Degrees Beaume	Degrees Specific Gravity	Weight per Gallon, Pounds	Degrees Beaume	Degrees Specific Gravity	Weight per Gallon, Pounds	Degrees Beaume	Degrees Specific Gravity	Weight per Gallon, Pounds
10	1.0000	8.33	32	.8641	7.20	54	.7608	6.34
11	.9929	8.27	33	.8588	7.15	55	.7567	6.30
12	.9859	8.21	34	.8536	7.11	56	.7526	6.27
13	.9790	8.16	35	.8484	7.07	57	.7486	6.24
14	.9722	8.10	36	.8433	7.03	58	.7446	6.20
15	.9655	8.04	37	.8383	6.98	59	.7407	6.17
16	.9589	7.99	38	.8333	6.94	60	.7368	6.14
17	.9523	7.93	39	.8284	6.90	61	.7329	6.11
18	.9459	7.88	40	.8235	6.86	62	.7290	6.07
19	.9395	7.83	41	.8187	6.82	63	.7253	6.04
20	.9333	7.78	42	.8139	6.78	64	.7216	6.01
21	.9271	7.72	43	.8092	6.74	65	.7179	5.98
22	.9210	7.67	44	.8045	6.70	66	.7142	5.95
23	.9150	7.62	45	.8000	6.66	67	.7106	5.92
24	.9090	7.57	46	.7954	6.63	68	.7070	5.89
25	.9032	7.53	47	.7909	6.59	69	.7035	5.86
26	.8974	7.48	48	.7865	6.55	70	.7000	5.83
27	.8917	7.43	49	.7821	6.52	75	.6829	5.69
28	.8860	7.38	50	.7777	6.48	80	.6666	5.55
29	.8805	7.34	51	.7734	6.44	85	.6511	5.42
30	.8750	7.29	52	.7692	6.41	90	.6363	5.30
31	.8695	7.24	53	.7650	6.37	95	.6222	5.18

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1202	8	1368	54	1582	153	1684-A	280	1823	168	1926	312
1206	18	1375	214	1584	153	1687	158	1825	168	1928	175
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1298	38	1536	133	1635	147	1770	165	1868	174	1992	171
1300	37	1537	133	1637	147	1775	165	1870	172	1993	171
1301	38	1540	104	1639	147	1777	166	1872	172	1993-A	171
1302	40	1543	208	1641	142	1779	165	1873	171	2000	27
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3304	260	3549	256	4405	119	4724	109	5139	270	5462	342
3305	260	3550	256	4408	119	4725	109	5141	270	5467	344
3306	260	3551	256	4409	119	4726	110	5143	270	5469	343
3307	260	3559	252	4414	119	4727	110	5147	270	5471	343
3310	241	3560	256	4416	119	4729	106	5149	270	5487	344
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3357	246	3574	253	4465	121	4791	82	5293	310	5554	300
3358	247	3575	252	4467	121	4792	82	5300	309	5558	302
3360	248	3576	256	4500	120	4795	82	5301	309	5559	303
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